DOCUMENT RESUME

ED 394 067 CE 071 470

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TITLE Training in the Motor Vehicle Repair and Sales Sector. Report for the FORCE Programme. European Report.
INSTITUTION European Centre for the Development of Vocational Training, Berlin (Germany).
REPORT NO ISBN-92-826-8913-1
PUB DATE 93
NOTE 94p.; For related reports, see ED 379 480-484 and ED 389 866-868.
AVAILABLE FROM UNIPUB, 4611-F Assembly Drive, Lanham, MD 20706-4391 (catalogue no. HX-85-94-866-EN-C: 8 European Currency Units).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Auto Mechanics; *Continuing Education; Curriculum; Educational Change; Educational Opportunities; *Educational Practices; Educational Quality; *Educational Trends; Education Work Relationship; Employment Qualifications; Foreign Countries; Labor Force Development; Postsecondary Education; *Sales Occupations; School Business Relationship; Synthesis; Technological Advancement; Transfer of Training; Trend Analysis; *Vocational Education
IDENTIFIERS *European Community

ABSTRACT

Trends in training for employment in the motor vehicle repair and sales sectors in the 12 European Community (EC) countries were identified through a review of 12 national reports that were prepared by 16 research teams involved in an EC study on continuing training in the motor vehicle sales and repair sector. Special attention was paid to the following topics: structure and characteristics of the motor vehicle sector in the EC; changing tasks in repair workshops and implications for skill requirements/development; and objectives, content, and delivery of continuing vocational training of the sector's work force. The following are among the trends and issues identified: increased quality consciousness; standardization and modularization versus transferability and mobility; adaptive versus forward qualification and qualification planning; roles of the providers of continuing vocational training; training concepts and their adaption to the needs of individual countries and repair shops; control versus cooperation of manufacturers and dealers; and high quality service stations as sites for vocational and continuing training. (Contains 23 tables/figures and 15 references. Appended are diagrams of the technical training scheme and technical service training curriculum identified and a table detailing registration of passenger cars in Western Europe by country in 1985-1992.) (MN)

ED 394 067

FORCE
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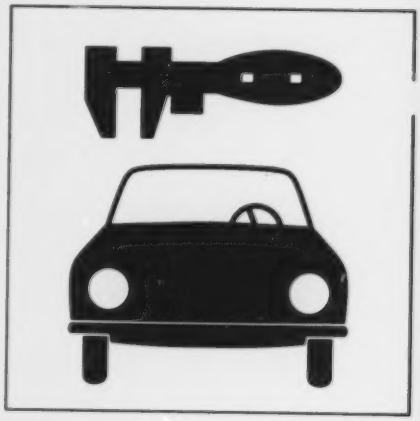
European Commission

EUROPEAN REPORT

MOTOR VEHICLE REPAIR AND SALES SECTOR



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Drawn up by **ITB, DTI,** coordinated by **CEDEFOP.**
TASK FORCE - Human Resources, Education, Training and Youth

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TRAINING IN THE MOTOR VEHICLE REPAIR AND SALES SECTOR

REPORT FOR THE FORCE PROGRAMME

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1993

First edition, Berlin 1994
Published by:
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The Centre was established by Regulation (EEC) No 337/75
of the Council of the European Communities

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 1995

ISBN 92-826-8913-1

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Printed in the United Kingdom

INTRODUCTION

The FORCE programme for the development of continuing vocational training in the European Community was adopted by the Council of Ministers on 29 May 1990 and launched on 1 January 1991.

Evolving from the growing recognition at Community and national levels of the strategic importance of continuing vocational training in the face of accelerating economic, social and technological change, FORCE was designed to achieve Community-wide impact on its quality and availability: to encourage increased investment in training in enterprises and to promote wider access to training for employees.

FORCE then has a twofold aim: to ensure that companies benefit from the skills and qualifications they require to maximize their economic performance, and to promote recognition of the training needs, rights and aspirations of the individual worker.

At the core of FORCE is the principle of the transfer of knowledge, experience and know-how throughout the Community. Based on active transnational partnerships between companies, the social partners and training institutes, FORCE projects – some 430 to date, with 3,500 partners – focus on the development and dissemination of innovative training management, techniques and materials, and the analysis of enterprise training needs. Research activities – sectoral surveys, analysis of contractual policy, the statistical survey of continuing vocational training in enterprises – provide a concentration of data on national systems and practices in all their diversity, and a substantial fund of information for both sides of industry, companies, and policy-makers at all levels.

Together these activities are creating a network to test, assess and disseminate good practice and innovation which respond to the real training needs of companies and the workforce; and, what is more, to promote mutual understanding of national diversity and contribute to the greater effectiveness of continuing vocational training mechanisms and their capacity to respond to changes in the European labour market.

The survey of training plans in the automobile repair and distribution sector is one of the first products of FORCE's research strand. The Task Force Human Resources wishes in particular to thank Professor Felix Rauner, as project leader and Dr. Georg Spöttl, of the Institut Technik und Bildung, and the central team as a whole – the Danish Technological Institut and the University of Crete – for the quality of the methodological concepts adopted, and the effectiveness of the European coordination. Thanks too to the national Institutes for their work in a new area of scientific exploration.

The survey is also the product of a fruitful association between the Commission and CEDEFOP and we are grateful to the latter for their indispensable methodological and technical assistance.

Finally, the active participation of the companies has been essential for the successful completion of this survey, and the Task Force Human Resources wishes to thank them warmly for their cooperation and support. We hope that the findings will be the starting point for extensive further discussion and promotion of skills, qualifications and high-quality training activities in the sector.

G. KINTZELÉ
Official responsible
for FORCE Programme

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Assistant FORCE
Programme

PREFACE

This report, the result of extensive work by ITB and DTI, is based on the 12 national reports prepared by the 16 research teams involved in the FORCE survey on continuing training in the motor vehicle sales and repair sector.

Before adopting a sectorial approach, which alone makes possible a real comparison of training, the report focusses on the common areas and the main trends in the organization of training in the branches, authorized dealerships, sales outlets and repair shops.

The trends observed are the leitmotif in this report. Indeed, this sector is dependent on the ongoing technological developments in motor vehicle construction.

Much water has passed under the bridge since the time, not so long gone, when chauffeurs repaired their cars themselves and the computerized after-sales service of today.

Constantly on the lookout for increased competitiveness, the sector offers a broad spectrum of organizational and training practices ranging from the most traditional to the most strikingly innovative. The authors are aware of this and examine the underlying reasons.

CEDEFOP would like to express its thanks to the authors of the national reports:

J. Denys, P. Arryn and H. Delagrange (B);
J. Knoblauch, N. Sorensen and K. Andersen (DK);
Professor F. Rauner, G. Spöttl, R. Lichte and H. Zeymer (D);
N. Pasatzis and Professor S. Papaioannou (GR);
C. G. Gonzalez, J. L. Esplugues, M. Méndez-Vigo and C. Prat (E);
N. Aguettant (F);
D. Tuite (IRL);
M. Volonta (I);
P. Krier and T. Mathgen (L);
J. Warmerdam, H. van den Tillaart and J. Bosker (NL);
Professor J. Pina da Silva (P);
G. Rhys (UK).

Special thanks are extended to Professor Dr. F. Rauner and Dr. G. Spöttl from ITB for their work on design and coordination, to K. Olesen and B. Clematide from DTI for their major contribution to the editorial work on the European Report and to O. Homs from CIREM for monitoring work in specific countries and his methodological support.

This report would not have been possible without the involvement of the companies and organizations in the sector or the training bodies in the Member States. Whilst respecting their wish to remain nameless, CEDEFOP would like to thank them for their substantial support.

Tina Bertzeletou
Project coordinator

Enrique Retuerto
Deputy Director

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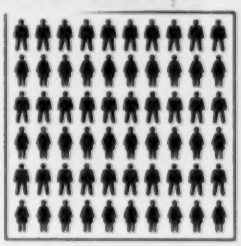
PART 1:
SECTORAL CONTEXT



1. INTRODUCTION

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4.4 Changing tasks leads to new challenges and continuing training strategies

1. INTRODUCTION

More than ever the motor vehicle sales and repair sector is the pivotal point of international economic competition. In manufacturing countries such as the United States, Japan, Germany, Italy, Spain, the United Kingdom and Belgium, the motor vehicle sector is the crucial factor for employment and prosperity. The MIT study on the superiority of the Japanese concept of "Lean Production" (WOMACK et al. 1992) has suddenly focused Europe's attention on the development, production, distribution and servicing of motor vehicles. The authors are of the opinion that manufacturers who cannot attain higher productivity and product quality in the motor vehicle sector by adopting the principle of lean production will not remain competitive on world markets. At the beginning of the 90's the first of two key problems in the motor vehicle sector emerged, i.e. the inexpensive production of high-quality products for competition on a, at present, customer-oriented market.

The second key problem is successful marketing of the motor vehicle, *the interrelationship between the motor vehicle manufacturers, repair shops and customers*. This is what decides whether the customer will buy a certain motor vehicle and whether he will be satisfied with service (maintenance and repair) offered by the brand-name representative. As long as the motor vehicle manufacturers' dream of a maintenance-free motor vehicle remains a pipe-dream, the strategic position of the motor vehicle repair shop will remain unchanged. From the economic point of view the motor vehicle repair shop is involved predominantly with the sales of motor vehicles; the ratio varying from between 20–80 percent. Repair and service is carried out in the repair shop. *Repair shop staff* are of crucial importance for the motor vehicle trade. To a high degree motor vehicle manufacturers depend on repair shops and their ability to swiftly diagnose and repair faults. The interaction between flexible production and the inroads of electronics in motor vehicle technology requires a high quality diagnosis and repair technology and good quality management in service and maintenance.

This is emphasized by the fact that certain countries have a comparatively large second motor vehicle market as motor vehicles are kept on the road for a longer period of time (for example, Greece and Denmark). Thus repair shops must cater for the needs of several generations of motor vehicle technologies.

In the motor vehicle sector, competitiveness depends directly on occupational skills in the field of services. *Quality of products* and *service* determine the survival of motor vehicle brands on the world market. It depends to a lesser degree on special technological know-how available worldwide, but more on qualifications of the staff engaged in production and servicing. There is scarcely a sector confronting such challenges with regard to vocational training and continuing training.

In certain European countries, the motor vehicle sales and repair sector is a particularly popular one for initial training (for example, Denmark and Germany). As a large share of apprentices migrate to other sectors – well over 50% during the first five years following completion of initial training in Germany, Denmark and Luxembourg – the motor vehicle sector in some EU Member States is an important place for general occupational and technical vocational training on the European labour market and its national branches.

Service and repair concepts have been developed jointly by European motor vehicle manufacturers and the trade associations. Subsequent quality standards are also implemented in extra-European markets (for example, the United States). These markets reveal whether European service concepts can compete with, for example, the Japanese concept on third markets. This will soon decide the fate of many European motor vehicle manufacturers.

This stresses the importance of this sector study with regard to the labour market, competition and training policies. The following chapter will examine the aims, concerns and methods used in this sectoral study.

2. THE FRAMEWORK OF THE STUDY

1.

As in other sectors (e.g. retail, food and beverages, etc.) this report was drawn up as part of the FORCE programme, the main objective of which is to promote larger and more efficient investment in continuing training with active participation of all partners concerned: employers, trade unions and governments. This programme includes sector studies which aim to identify and analyze the best and most important experiences gathered by a number of companies in the twelve EU Member States.

Sectoral studies are expected to examine among other things six particular points in the Social Dialogue:

a. *Training plans and training concepts on repair shop level*
Are there training concepts for continuing vocational training at repair shop level available for staff? Does the training plan adopt a global approach to training issues? Does organization exist to deliver continuing vocational training ?

b. *The interlinkage of training concepts and demand*
How are training plans formulated? How can they meet training demands? How are needs analyzed?

c. *Target groups of training*
What are the target groups for training? Are all employees involved?

d. *Contents of training programmes*
What are the aims and contents of training programmes? To what extent do training programmes meet the workers' individual needs as well as those of the company's?

e. *Training costs*
What are the costs of continuing vocational training?

f. *Evaluation of concepts and costs*
Is there any evaluation of the costs, the training concepts and the results of training? Are costs/benefit analyses available?

Discussion of these six points in the Social Dialogue includes consideration of the interrelationship between initial and continuing training. There is a need to develop a better understanding of continuing vocational training.

The motor vehicle sales and repair sector was selected by the FORCE programme as the third sector for analysis. The approach in this study is similar to that in the first study on the retail sector where the validity of the approach was already tested. The idea behind the study is to acquire 'knowledge of the situations and practices in the field of continuing vocational training in the different Member States... The need for this knowledge has become more important than ever. Indeed, it fosters development as stated in the Maastricht Treaty, of exchanges of information and experiences on issues common to education systems of the Member States' (Article 127) and thus implementation of vocational training policy responding to the training and qualification needs in the Member States and those in the Community as a whole.[1]

The sectoral approach which has been adopted for this study – it is part of the FORCE programme – should help to initiate and develop perspectives for designing work organization with regard to the use of qualifications and modern measuring and diagnostic tools, for skills and abilities, exchanges of experience between repair shop and manufacturer concepts for training, concepts for customer service and for access to continuing vocational training. It is a useful means of identifying and analyzing individual continuing training experience and of assessing their importance in the various national contexts. Obviously individual experience is likely to appear more homogenous and comprehensible if identified in the same sector.

The overall idea is to promote continuing vocational training as a key element for improving competition in the European market and for making it the core of the Social Dialogue. One of the most important measures is to grant access to continuing vocational training to every employee.

2.1 Defining the sector: motor vehicle sales and repair

All studies in the motor vehicle sales and repair sector took place at repair shop level as far as case studies are concerned. The sectoral analysis should serve as a reference framework for analyzing and comparing recent trends in EU Member States and their implications for training.

Definition and demarcation of the sector ensures that national surveys and statistical data cover the same area. This also offers a framework for analyzing individual training experiences in the same fields and at the same levels and for comparing them within the national context and within the EU context.

The most important criteria for defining and demarcating the motor vehicle sales and repair sector are:

[1] Task Force Human Resources, Education, Training and Youth: Synoptic Tables – information available in the twelve Member States on continuing vocational training. FORCE, Brussels, page 5.

- the size of companies and
- the types of companies.

The following classification of company size was adopted for the studies:

Type I 1– 4 employees
Type II 5– 9 employees
Type III 10–19 employees
Type IV 20–49 employees
Type V over 50 employees

With regard to the situation in the motor vehicle sales and repair sector companies were defined as follows:

A Subsidiaries of motor vehicle manufacturers (Controlled by motor vehicle manufacturers)

B Subsidiaries of motor vehicle manufacturers (Independent of motor vehicle manufacturers)

C Authorized sales and repair shops (Independent but linked to motor vehicle manufacturers/producers)

D General repair shops and independent repair shops

E Motor vehicle dealers

F Repair shops specializing in the repair of components and aggregates.

Independent secondhand motor vehicle dealers did not form part of the survey. They were only taken into consideration if they belonged to the above-mentioned types of companies.

Motorcycles, service stations and leasing agents were also excluded from the study.

This restrictive definition aimed to avoid confusion as far as possible. Some countries had difficulty in adhering to the definition and demarcation on account of the fact that some statistical data included motorcycles or service stations.

2.2 Defining continuing vocational training

In order to cover the wide area of training offered in the motor vehicle sales and repair sector, the survey generally adopted the concept underlying continuing vocational training in other FORCE activities:

> "A structured activity, financed wholly or in part by companies, directly or indirectly, in order that the persons employed might improve, acquire or maintain their skills, knowledge or qualifications from time to time in their working lives."[2]

The definition covers a number of different training activities important to the motor vehicle sales and repair sector:[3]

a. *Training managed and designed by training providers*

Education or training courses designed and managed by colleges or other training organizations outside the company;

Training provided by suppliers or customers. This is training designed and managed by suppliers to or customers of the company;

Training at conferences, repair shops, symposium and seminars where the primary purpose of the company in sending an employee is to increase his/her knowledge or skills.

b. *Training managed and designed by the company*

Internal instruction and training courses designed and managed by (or for) the company and available only to the employees of the company;

Planned periods of training, tutoring, instruction or practical work experience, either at the place of work or in the work situation where the primary aim is to teach or develop new skills;

Planned learning through work organization – for individuals or groups of workers (e.g. job rotation, exchanges, quality circles).

c. *Training implemented by the company and managed by the employee*

Distance or computer-based learning (including company supported access to internal (within the company) or external learning centres).

Chapter 6 provides detailed explanations of the organization of continuing vocational training in the motor vehicle sales and repair sector.
The above-mentioned definition roughly covers the area of this study. The case studies show, however, that it was sometimes difficult to draw a line between the different concepts of training. On the whole, the range of the seven training

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2 Meeting of the working group "Continuing Vocational Training Survey" held on 19 May 1992, Eurostat Dec. E1/812/92

3 Continuing Vocational Training Survey. Draft list of training activities. Eurostat.

characteristics in a, b and c will help to allocate the most important training activities to different levels. The seven characteristics of training cover training in different kinds of institutions as well as training delivered directly during the working process through practical experience or distance learning courses.

The relationship between initial and continuing training proved to be difficult. Initial training takes place immediately after compulsory schooling and is usually clearly defined as preparation (e.g. apprenticeship, trainee) for entering the sector with a minimum of qualifications necessary for work within the motor vehicle sales and repair sector.

2.3 Methodology

The methodology was formulated by the Central Team and for the most part adhered to the example of the retail sector. New instruments were developed to conduct case studies and sectoral surveys. CEDEFOP and TASK FORCE provided support in this work. The most important objective in developing these instruments was to meet the above-mentioned aims.

2.3.1 Selection of the case studies

The surveys focused on good and normal practice in small and medium-sized companies. Training programmes of companies found to be particularly innovative in this sector were included in the case studies if considered appropriate by the researcher.

The core of the study within the companies are the findings on the company's training policies and training concepts as well as training practice. Attention was given to identifying the current situation, efficient models with a high chance of transferability to another context, i.e. to other firms and countries.

The survey's initial aim was to conduct some 50 case studies throughout the EU Member States. In view of the some 400,000 companies and 1.8 million employees engaged in the sector, it was not intended to establish a representative sample based on purely statistical methods, but the cases were selected in order to represent a qualitative "European landscape". The main aim was to produce an overview of the European sector and to avoid subjective decisions in the absence of objective criteria. Based on these aims, criteria had to be selected to meet the aims of the study.

The survey was to be designed in such a way as to identify and explain models of good and normal practice with regard to continuing vocational training. This included a discussion of training concepts, target groups, training needs, strategies and costs. Models which turned out to be particularly innovative were to represent a help for orientation in future planning within the twelve Member States. In order to avoid random selection, the following criteria were adopted:

- market shares of the countries with regard to sales
- sales of makes in the Member States
- size of repair shops
- type of repair shops (subsidiaries, dealers, independent repair shops, etc.)
- types of vehicles (cars, trucks, others)
- training activities.

This resulted in a matrix representing the European motor vehicle sales and repair sector.

These criteria were applied in selecting the case studies shown in the table.

Table A – Number of case studies based on market share of countries

Country	Case Studies
B	4
DK	4
D	5
GR	4
E	4
F	5
IRL	4
I	5
L	2
NL	4
P	4
UK	5
Total	50

There was no reliable distribution factor for the classification 'type of companies'. The proposed distribution takes into account the importance of the different types. The deviation of the final number does not influence the European landscape.

Figures also include categories of motor vehicles such as:

a. passenger cars/light commercial vehicles
b. lorries
c. others

The share of lorries in Europe is some 14% resulting in 7 cases in Table C. Most of the other companies, however, also include lorries as well. For this no additional statistics were included.

Seven case studies were planned to be conducted at specialist companies in various components and specific vehicles. Ten case studies were conducted in all-round companies.

In order to focus the survey on the sector and to encompass the whole range of continuing vocational training within a company in the sector, a

Table B – Number of case studies based on makes and their sales in EU Member States

Brand Name	Planned case studies	Final number of case studies realized
VW/Audi & Seat	5	6
Peugeot/Citroën	4	4
Fiat	3	2
Japanese Brands	5	6
Renault	3	3
Ford	2	2
Opel	2	2
Mercedes Benz	2	3
BMW	2	2
Rover	2	2
GM	1	1
Saab	1	1
Volvo	1	1
Total	33[1]	35[1]

[1] Minor changes to these figures are attributable to the fact that not all the selected outlets carried out continuing vocational training during the period of the study.

Table C – Number of case studies based on type of repair shop (trucks/components and general repair shops)

Type of repair shop	Planned case studies	Final number of case studies realized
General repair shops/companies	10	9
Specialists in components and special motor vehicles	7	6
Trucks (included in brand names – no extra counting)	(7)	(19)
Total	17	15
Grand Total B + C	50	50

Table D – Number of case studies based on the size of companies and number of employees

Size of company	I 1–4	II 5–9	III 10–19	IV 20–29	V over 50	Total
Case studies planned	6	12	12	10	10	50
Case studies carried through	6	12	10	12	10	50

On account of the fact that precise figures were not available for each country, the distribution of the companies in the different groups is estimated as are the number of employees.

Table E – Number of case studies based on types of companies

	Planned case studies	Final number of case studies
A. Subsidiaries of manufacturers (controlled by manufacturers)	8	11
B. Subsidiaries of manufacturers (independent of manufacturers)		
C. Authorized repair and distribution repair shops (independent but linked to motor vehicle manufacturer)	24	26
D. General motor vehicle repair shops and independent repair shops	3	5
E. Motor vehicle dealers	5	2
F. Repair shops specialized in the repair of components and aggregates	10	6
Total	50	50

15

description of a case study was formulated. Thus, a case is a single repair shop. A repair shop and the customer service training centre or a motor vehicle manufacturer, however, is also a case study. A case study includes the repair shop linked to a motor vehicle manufacturer within any company. This is true for all subsidiaries and authorized sales and repair shops. Where a survey in a repair shop linked to a motor vehicle manufacturer was conducted, emphasis was placed on the repair shop itself and the customer service training centre belonging to the motor vehicle manufacturer. The system and philosophy of customer service training was one of the major factors in the case study. The repair shop and the motor vehicle manufacturer represents one case study which was conducted and evaluated.

It is important to note that all case studies had to refer to the motor vehicle sales and repair sector. The employees of the company had to be the focal point of interviews and of the case study itself. The analysis of continuing vocational training of employees revealed all the necessary information on trends in continuing vocational training.

Implementation of this approach at national level required:

- an adequate knowledge of the current situation with regard to training in a number and variety of companies;
- the participation of employers' and employees' organizations;
- firms, willing to take part in the survey.

In order to present a sound overview of the European sector, the case studies had to be selected on the above-mentioned criteria.

The selection of case studies had to be considered at a European level, with a view to designing a European image of the sector. A sample of more than 100 cases was preselected in the twelve countries. Final selection of 50 cases was carried out at European level through adhering to these criteria in order to achieve a well-balanced sample representative of the European sector.

2.3.2 Context and comparability

Training experiences could not be understood without placing them in the context of the company and country. This framework is necessary in order to understand specific structures and activities as well as the relationship between commercial aims, changing strategies, training concepts and training practice. For this reason, each study had to be seen in the national context. The national context was presented in each report. The authors are aware that:

- analysis of workers' experience of continuing training is part of their subjective socialization. This implies that comparison of national sectors require objective criteria in the context of specific social and cultural conditions. In this kind of study this is not possible. Existing differences, however, may be pointed out and discussed.
- However, some trends as a result of technological development which are monitored by a small number of large motor vehicle manufacturers lead to a comparative homogeneity in some areas of the sector on account of the fact that manufacturers influence the process of development through the technology applied.

Finally, it must be stressed that an international study such as this one requires disciplined coordination to ensure wide compilation of data with regard to quality and quantity. The presentation of the reports must be consistent to ensure an appropriate level of comparability. Rather than imposing a rigid structure going beyond the guidelines mentioned above, this study attempted to encourage a common approach on the part of all participants.

2.4 Implementation of the survey and problems encountered

The investigations in the motor vehicle sales and repair sector were conducted by sixteen national research teams – usually one from each country, but three from Belgium, two from Germany and two from Greece. The Central Team provided guidelines and tools for the investigations. Detailed guidelines were formulated for interviews with company representatives, training managers and customer service training centres. In line with the philosophy behind this study, to promote contact with workers and their representatives, a special questionnaire was drawn up to obtain a more objective view of the current situation with regard to continuing vocational training. No specific guidelines were prepared for interviews with trade union representatives or trade associations.

The study may be summarized in four important areas:

- Design of the sector report
- Pre-selection of case studies
- Final selection of case studies
- Conducting the case studies.

A number of problems arose with implementation of the survey.

1. Design of the sector report was an important and, in some cases, difficult process. The study required a good overview of the sector and called

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upon all sources of influence (e.g. trade associations, trade unions, manufacturers' organizations, statistics institutes, publishers, etc.) in order to paint a full picture of:

- the process of technological development;
- the development of the various types of repair shops and sales organizations;
- the importance for the future of the motor vehicle sales and repair sector to a country;
- trade regulations in the sector;
- the systems and philosophy behind continuing vocational training and their development.

Due to a lack of data and complexity of the sector in some countries, it was not always possible to obtain a full picture.

The inadequacy of information made itself felt at the level of national data and at company level. With regard to national data, the situation varies greatly from country to country. On the other hand the main manufacturers' organizations were able to provide important information and facts. It was more difficult to get valid information on continuing vocational training. The reason for this was pointed out in most case studies: many companies which accept and support continuing vocational training do not follow-up or evaluate this.

In many countries there is still a lack of data on:

- average number of employees per company;
- number of employees on the level of

  skilled workers
  master craftsmen
  apprentices
  administration clerks/white-collar managers

- number of women
- number of training days per employee annually.

The aim of the forthcoming continuing vocational training survey undertaken by Eurostat and Task Force Human Resources, Education, Training and Youth as part of the FORCE programme is to fill this gap.

2. During the process of preselecting case studies, the social partners often favoured companies carrying through a model of good practice in continuing vocational training. Models of normal practice were sometimes not the focal point of the selection procedure.

3. During final selection, which was carried out at European level, the major task was to avoid disproportions and to adhere to the selection criteria.

4. The process of conducting the case studies also revealed a variety of experiences. In general, current conditions differ greatly from country to country. Usually, companies and their representatives were helpful in giving interviews with different persons at different levels within the hierarchy. This resulted in substantial, detailed interviews providing a clear picture of the situation with regard to continuing vocational training and the factors which influence this.

On the other hand, some companies only agreed to interviews with their manager or his representative. Hence, some of the descriptions of the case studies reflect essentially the managerial view.

There were no particular problems in analyzing other institutions, trade associations, trade unions, government organizations, involved in continuing vocational training in the motor vehicle sales and repair sector.

With regard to some very detailed analyses of training, training plans as well as philosophies, strategies and training demand compared with the needs of manpower in the sector and technological development, it was possible to develop an objective and thorough assessment of different training models (normal practice, good practice). The transferability and future trends in different models and their implications will be discussed.

3. STRUCTURE AND CHARACTERISTICS OF THE MOTOR VEHICLE SECTOR IN THE CONTEXT OF THE EUROPEAN COMMUNITY

3.1 Historical development

The development of motor vehicle repair shops and motor vehicle dealers in Europe has taken place in three subsequent phases:

1. The motor vehicle repair shop at the manufacturer's plant and repair at the locksmith's shop.

2. The motor vehicle trade and authorized repair shops and dealers.

3. The organized authorized repair shop.

The development of the motor vehicle trade is closely linked to the development of the structure of the motor vehicle sector (trade and industry), as a whole.

The invention of the motor vehicle – C. F. Benz called his invention the "patent motor vehicle" in 1885 – took place at a time when the railway was growing as an efficient system for transporting passengers and goods in many European countries. Up to World War I, the motor vehicle was no serious competitor as a means of transportation and had a rather symbolic significance as a demonstration of wealth, social status and nobility of its aristocratic proprietors who could thus show their independence from mass transportation, above all from the railway. (I. Petsch: Vom kollektiven zum individuellen Verkehrsmittel.)

Carl Benz exhibited his motor vehicle at the Paris Fair of 1887, squeezed in between horse carts. It received little attention, but in subsequent years a modest manufacturing of motor vehicles developed in Europe. In 1894 the Paris-based machine tool company Panhard et Lavasser was the world's leading motor vehicle manufacturer after Emile Lavasser had acquired a licence from Gottlieb Daimler in 1887 to manufacture the Daimler petrol engine (cf. Womack et al. 1992, p. 25ff). The third "International Motor Vehicle Fair" in Berlin hosted some 134 exhibitors. In 1911, some 55,000 motor vehicles and motorcycles were registered throughout Germany.

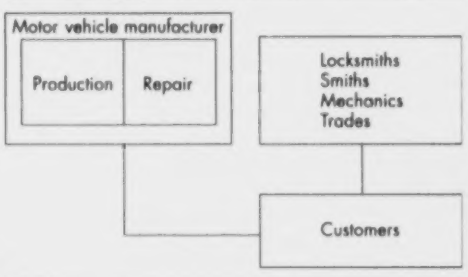
At the outset of motor vehicle manufacture, repair and maintenance work was carried out mainly by the chauffeurs on account of the fact that motor vehicle owners could afford a chauffeur. By the turn of the century through participation in the production process of their motor vehicle, chauffeurs learned how to carry out simple repair tasks.

Up to World War I, there were scarcely any independent repair shops in Europe specializing in motor vehicle repair and maintenance for a variety of reasons:

- the metal processing trade had not yet developed the necessary machine tools, assuring adequate precision in producing spare parts;
- manufacturers had produced no indications of production standards to be adhered to. Most of these were kept secret (standardized fitting systems were only introduced during World War I);
- the materials required were not available and certain production steps unknown;
- few craftsmen had realised the importance of imminent motorization and were willing to take the risks and make changes on account of the capital outlay required and the predominating conservative attitude.

Diagram 3.1 shows the relationship between manufacturer, repair shop and customer which developed during the phase of craft production of motor vehicles.

Diagram 3.1 – Production – repair shop – customer at the beginning of the 20th century



The development of an independent motor vehicle trade depended directly on the transition from handcrafting of motor vehicles to mass production. The introduction of assembly line production at Ford's aimed at simple operation and maintenance of the motor vehicle, a factor crucial for mass production. Ford presumed that motor vehicle owners would carry out the necessary repair work themselves. "Consequently the Model-T manual explained on 64 pages with questions and answers which the motor vehicle owner could use simple tools to repair each of the 140 problems described which were likely to occur in the motor vehicle" (Womack et al. 1992, p. 34).

The introduction of mass production in Europe resulted in a drastic reduction in manufacturing companies. This also marked the birth of standardization of repair through original spare parts. Authorized repair shops developed. The manufacturers attempted to offer safe and reliable service for the customer and to reduce the risk of inadequate repair. The more repair shops catered for motor vehicles sold, the greater became the manufacturers' interest in increasing standardization of tasks in repair shops (through dealer contracts and training).

Since the 70s, developments in repair shops have been characterized by an expansion of the concept of authorized repair shops, combined with specific division of tasks between manufacturers and such shops. The dichotomy between increasing complexity in repair shops on account of the introduction of micro electronics equipment and the networking of motor vehicle components by microprocessors and the economic necessity to produce maintenance and repair free motor vehicles, have forced manufacturers to increasingly integrate and mould service and repair of "their" motor vehicles to a marketing strategy. The sale of a motor vehicle assumes a clearly determined amount of guarantee provisions and service required by the customer from dealers or repair shops. As guarantee periods for certain motor vehicle parts increase – some manufacturers guarantee motor vehicle bodies for up to six years – the repair shops will increasingly work on behalf of the manufacturer. By providing programmed service, the manufacturers attempt to standardize and minimize expenditure on repair and service in the repair shops. This is the case for

- parts to exchanged, components and aggregates;
- costs (working time, material costs, general expenditure);
- work procedures following instructions and programmes; and
- size of spare parts stock.

With the introduction of computerized on-lined networks to the manufacturers, the programmed authorized repair shop is slowly drifting towards a sphere of business (sub-centre) linked to the manufacturer.

In addition to this dominant trend, a number of original and country-specific dimensions of the motor vehicle trade in EU Member States also play a less important role.

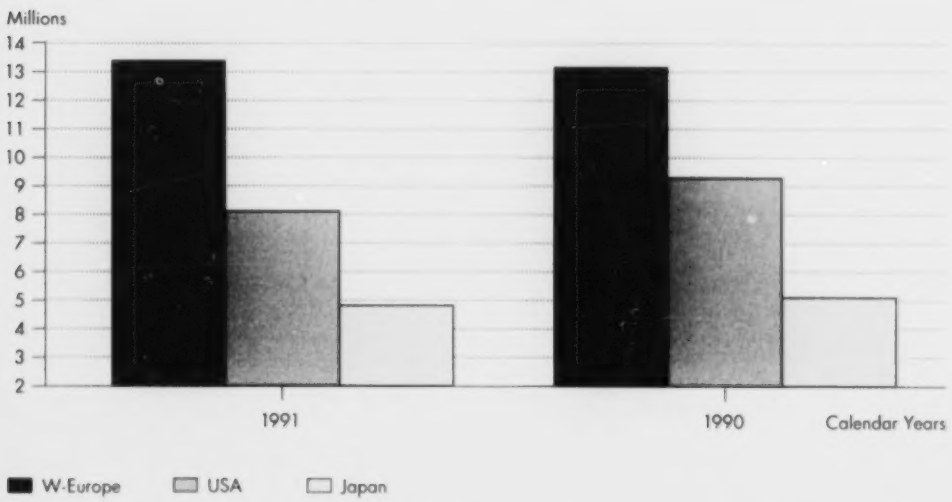
3.2 Structure of industry, repair shops and sales

3.2.1 The motor vehicle industry as the key sector for integration in Europe

According to the AID Motor Vehicle Yearbook 1992 (Diagram 3.2) more motor vehicles were registered in the course of that year in European countries (EU and EFTA Member States) in 1991 (44.8%) than in the United States (27.1%) and in Japan (16.2%) taken together (43.3%).

This represented an increase of 2% over 1990 figures. With the economic rapprochement of the Eastern and Western European countries and the step by step integration into an all-European economic area, Europe obviously will form by far the largest market for the world's motor vehicle industry in the next decade and beyond. This market, compared to the U.S. or Japan, has not been saturated and the motor vehicle industry in Europe will be a growing economic sector beyond the turn of the century. The degree of competition between European manufacturers and extra European manufacturers depends on two factors:

Diagram 3.2 – Passenger car registrations – key western world markets



AID Graph YB921/01

Table 3.1 – World passenger car sales on major markets

Area	Year 1991	% Share	Year 1990	% Share	% Change
Europe[1]	13,504	44.8	13,259	42.7	1.9
USA	8,176	27.1	9,300	29.9	-12.1
Japan	4,868	16.2	5,102	16.4	- 4.6
Canada	873	2.9	886	2.9	- 1.5
South Korea	773	2.6	604	1.9	28.0
Brazil	596	2.0	526	1.7	13.3
Mexico	396	1.3	354	1.1	11.9
Australia	388	1.3	463	1.5	-16.2
Taiwan	350	1.2	353	1.1	- 0.8
South Africa	198	0.7	210	0.7	- 5.7
Total	30,122	100.0	31,057	100.0	- 3.0

[1] 17 markets

Source: AID

- attaining productivity comparable to that of competitors;

- attaining product quality comparable to Japanese competitors.

Both these factors account for the comparatively high Japanese market share in European countries which do not manufacture motor vehicles. The share of newly-registered vehicles in some European countries exceeds 40% (Ireland: 45.9%; Finland: 44.4%; Norway: 44.9%; Denmark: 42.3%). Motor vehicle manufacturers such as Italy (2.7%), Spain (3.2%) and France (4.1%) have a very low share of Japanese motor vehicles. There has been no substantial change in market shares in these countries over the past five years. If one takes into consideration Japanese subsidiaries in new Member States, the picture is changing in favour of Japanese motor vehicle manufacturers with plants in the UK and Spain. This is, however, not the subject of this study.

Major world passenger car sales (Table 3.1) which reached some 31 million motor vehicles on major markets (1990) and which will maintain and even increase its size after a temporary decrease on account of a recession, clearly shows a different emphasis compared to European markets.

These figures show that only 16% of all new motor vehicles were sold in Japan, whereas Japan's share in west European markets was 37%.

The economic situation of the motor vehicle trade does not depend on this development as it is of little significance to a repair shop or dealer whether they sell and repair European or foreign makes of motor vehicles. In the European economic context it is important to establish the share of the European motor vehicle trade in the European sector.

Diagram 3.3 illustrates trends in motor vehicle density in European countries (inhabitants per motor vehicle) between 1987 and 1991. It confirms continued growth in the numbers of motor vehicles and shows interesting differences between certain European countries. In 1987, countries such as Portugal (6.4), Greece (5.0), Ireland (4.5) and Spain (3.4) had a motor vehicle density exceeding one motor vehicle per three inhabitants. Other EU Member States had rates clearly below these in the same year, Denmark (2.8), Germany (2.1). The developments in 1991 show three notable trends:

- Between 1987 and 1991 there was an overall reduction in this gap with regard to motor vehicle density. The gap between Portugal and Germany (6.4 v. 2.1) had been reduced to 4.9 v. 1.9 within 4 years. This convergent trend is common to all EU Member States.

- Countries with the highest motor vehicle density showed a ratio of one motor vehicle per two inhabitants. Differences between Luxembourg, Germany, Italy and France had become negligible. There is a strong trend towards such a ratio in the UK (2.2), Belgium (2.3), the Netherlands (2.4), Denmark and Spain (2.7). There are certain exceptions in Denmark which has the lowest increase (0.1) and Spain with a higher density than Denmark in spite of significant motor vehicle density in 1987 (3.4).

- EU Member States with the lowest motor vehicle density ratio in 1987 also showed the most marked increases (Portugal, Greece, Ireland).

Comparing developments in Europe with those in the United States and Japan, it is notable that the U.S. with a density of 1.75 inhabitants per motor vehicle, has a slightly higher motor vehicle density than the highest densities of European countries.

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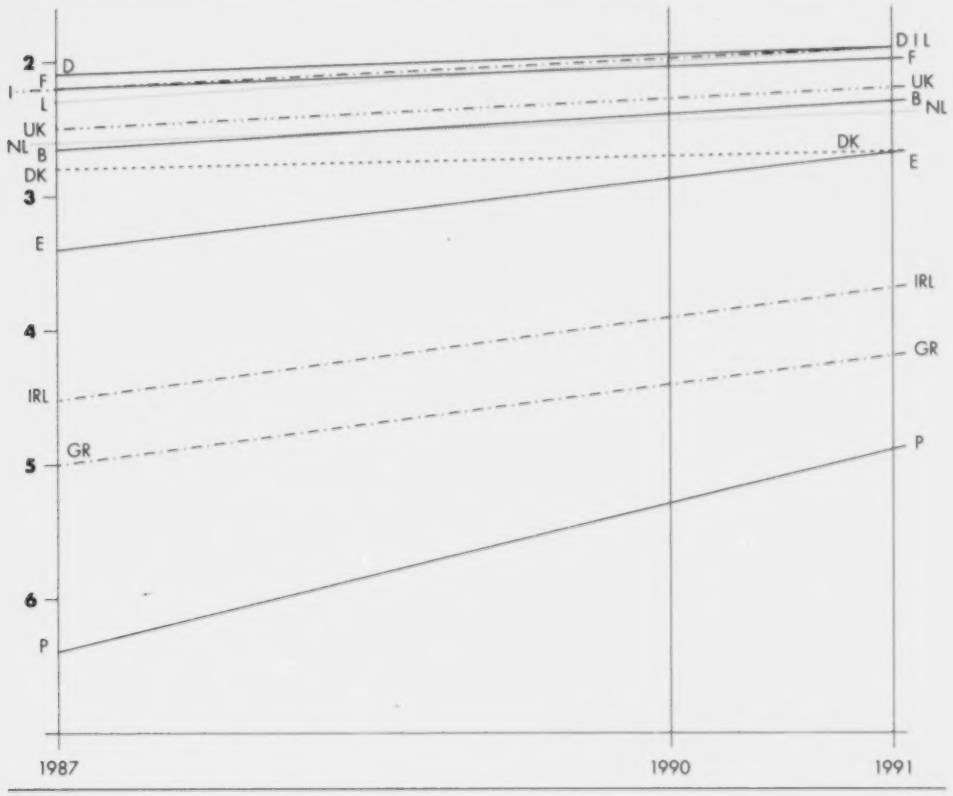
Diagram 3.3 – Development of motor vehicle densities in European countries (inhabitants per motor vehicle)



Country	1987	1991
B	2,7	2,3
D	2,1	1,9
DK	2,8	2,7
E	3,4	2,7
F	2,2	2,0
GR	5	4,2
IRL	4,5	3,7
I	2,2	1,9
L	2,3	1,9
NL	2,6	2,4
P	6,4	4,9
UK	2,5	2,2

Population per car

This may be attributable to the different function of the motor vehicle versus the railway and public transportation in cities as a means of transportation in Europe. The comparatively low Japanese figures – similar to that of Ireland – stem from a multitude of reasons which are not the subject of this study. One of the major issues is the traffic structure of Greater Tokyo which does not allow for further expansion of private transportation.

Besides the motor vehicle industry, the sales and repair sector accounts for considerable employment and economic activity in European countries. In Germany the sector accounts for 8.5% of the GNP, in Spain for 7%, in the UK for 2.5%. The other countries have values of between 3 and 6%. The motor vehicle sales and repair sector in the EU accounts for 362,836 mostly small- and medium-sized companies, employing a total of 1.83 million people (Table 3.2).

In comparing EU Member States, important differences can be noted:

- in the ratio between registered motor vehicles per person in the repair and sales field;
- in the ratio between the persons employed in the sector over the total number of inhabitants.

A long-term comparison of the numbers employed in the motor vehicle sales and repair sector with the number of motor vehicles directly reveals maintenance and repair expenditure per motor vehicle (Diagram 3.4).

The comparison is not highly accurate on account of the number of moonlight companies and an informal motor vehicle sales and repair trade. No precise data are available on these. Customer interviews reveal, however, that with increasing

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Table 3.2 – Number of companies and persons engaged in the sector and number of inhabitants (1991)

	Companies	Persons engaged in Sector (A)	A/B (x 10 –2)	Inhabitants in Mio (B)
B	14,736	44,303	0.44	10
D	44,847	357,000	0.56	63.2
DK	12,800	46,000	0.90	5.1
E	52,000	206,000	0.53	39
F	67,000	400,000	0.73	56.3
GR	17,804	72,112	0.72	10.1
IRL	2,546	12,464	0.33	3.7
I	107,500	264,000	0.46	57.6
L	421	3,800	0.95	0.4
NL	12,000	70,000	0.47	15
P	6,948	72,628	0.726	10.3
UK	22,700	273,688	0.48	57.4

age of motor vehicles, "Do-it-Yourself" and the use of moonlight firms is increasing.

In 1949, one motor vehicle mechanic in Germany catered for 14 motor vehicles compared to 40 in 1965 and 100 motor vehicles today. Since 1949 the motor vehicle fleet has increased six fold over the number of persons employed. This accounts for the fact that with a slowing down in the increase in the number of motor vehicles in EU Member States, the number of persons employed in the sector is also decreasing.[4]

The substantial differences in the ratio of motor vehicles per person employed within EU Member States reflects the very different structures of the motor vehicle sales and repair trade. When ignoring the differing structures of the motor vehicle fleets in EU Member States in an initial approach to this phenomenon – characterized by a differing average lifespan of motor vehicle and market shares of makes – it is evident that the majority of the EU Member States show considerable rationalization potential in the sector. With respect to a modern motor vehicle fleet with an average lifespan of 10 years, and a further prolongation of service intervals, and a reduction of the need for repair, Europe will show a value far beyond 100 motor vehicles per mechanic within the next decade, in spite of the growing technical complexity of the motor vehicle (cf. Chapter 4). Given the estimated continued increase in repair shops and the development of dealer structures and the number of persons employed, two contradictory trends will have to be balanced:

- the differing increases in motor vehicle density;
- application of rationalization measures in service and repair.

In a matrix (Table 3.3) the EU Member States can be allocated to four different areas: two areas have a high motor vehicle density; area I with a high motor vehicle density and a high number of motor vehicles per person engaged in the sector and area III with a high motor vehicle density and a low number of persons engaged. Two areas show a low motor vehicle density: area II with a higher and area IV with a lower number of motor vehicles per person employed in the sector.

Area II has favourable prerequisites for stable development of the labour market. Should a clear trend towards an increase in the motor vehicle density (area II, Ireland) prevail, this will result in an increase of persons employed and to a lesser extent in higher productivity rates as this value is already quite high.

Table 3.3 – Matrix of allocation of the EU Member States to areas according to motor vehicle and employment density (1991)

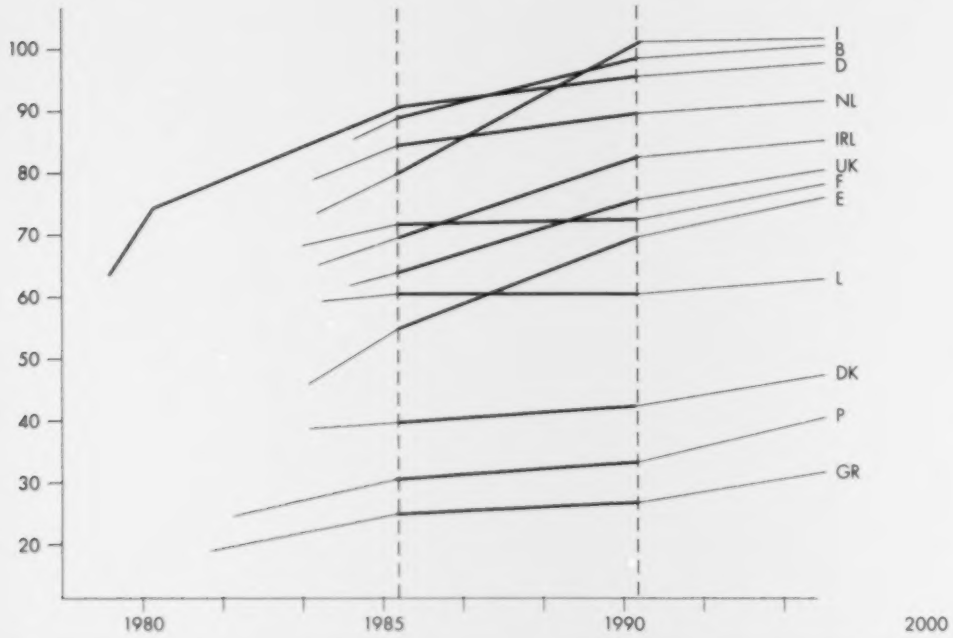
I		II		
Germany	95	Ireland	83	II high
Netherlands	87			
Belgium	97			
Italy	100			
Denmark	41	Greece	34	
Luxembourg	59	Portugal	33	IV low
France	71			motor vehicles
Spain	70			per person
UK	73			in sector
III high		IV low		

motor vehicle density (per inhabitant)

Area IV may witness major structural changes with an increase in motor vehicle density. Both Greece and Portugal show a high number of persons employed in the motor vehicle repair sector in

[4] This is only one factor. Rationalization in the repair shops is also reducing employment in the sector.

Diagram 3.4 – Trends in vehicles per person employed in the sector



Country	1983/85/87	1991
B	87	97
D	90	95.5
DK	–	41.3
E	54	70
F	72	71.3
GR	–	34
IRL	68	83
I	80	100
L	59	59
NL	84	87
P	–	33
UK	63	73

motor vehicles per person in sector

spite of low motor vehicle density. The expected structural change in Area IV is characterized by an increase in the motor vehicle fleet and a decrease in the persons employed in the sector. An important precondition for this development is European policies aimed at harmonizing levels of economic activity in EU Member States. A clear adjustment of motor vehicle density (Table 3.2 and Diagram 3.3) will indicate the success of this policy.

The structural change in Area I is comparatively low. The slight decrease in the number of persons employed is worthy of note. This is attributable to an improvement in the quality of motor vehicles (including European makes) and to longer periods between services. On account of market saturation in Area I, there is only a need for motor vehicle replacement (i.e. 8–10% of existing motor vehicles in use). Thus, the secondhand motor vehicle market will increase slightly over the total number of registered vehicles. This will contribute to some extent to motor vehicle repair and service.

Area III encompasses those countries likely to experience a decrease in the number of persons employed in the sector over a long period. Spain is an exception as the rapid increase in motor vehicle density compensates for the numbers employed. On the other hand, this points to substantial structural change in repair shops. The ratio of 1–70 in a producing country indicates a considerable need for modernization which has commenced with modernization of equipment over recent years.

Luxembourg occupies a special place in this comparison. The comparatively high number of those employed in this sector cannot be attributed to a greater need for repair of motor vehicles, but to customer behaviour. Motor vehicle owners in Luxembourg call for servicing in repair shops twice as frequently as their counterparts in other EU Member States. Presumably, there will be only minor changes in the Luxembourg workforce in the motor vehicle sales and repair sector in the future (e.g. L1, 2).

The structure of the motor vehicle trade (dealers and repair shops) is influenced clearly by the motor vehicle market in EU Member States. This again, is influenced by:

- the salary situation of the population and their standard of living as well as the price of motor vehicles; in Denmark salaries are very high, but, on the other hand, the cost of living is clearly well above the European average. Prices for new vehicles are 40% higher than in other EU Member States. This is the reason for an older motor vehicle fleet.

- the share of motor vehicle makes in a country's motor vehicle fleet; as motor vehicles from different manufacturers require differing amounts of repair, this influences the structure of the repair shops to a certain extent. A high share of motor vehicles requiring little repair is thus influencing employment.

- Motor vehicle density and the country's geography; in industrial areas it is easier to set up a dealer and repair shop network linked to manufacturers than it is in less populated areas with a lower traffic density. In regions with a smaller market share, the manufacturers have to conclude dealer contracts with repair shops catering for their makes.

The classification of motor vehicle sales and repair shops according to their size and their activities (independent repair shops, authorized repair shops, etc.) produces insight into the structure of the companies in the EU Member States.

3.2.2 Manufacturers and their authorized outlets and dealers

All manufacturers are interested in exclusive dealers' contracts as they seek to promote their own products. They are convinced that an outlet/dealer can only achieve high quality in service and trade when specializing in the product of a single manufacturer. The share of manufacturers' subsidiaries and authorized dealers in EU Member States is high on average. More than 60% of motor vehicle dealers are linked to a manufacturer or importer in all EU Member States with the exception of Greece, Portugal and Spain, which have a share of more than 80% of independent repair shops.

The average number of persons employed in motor vehicle outlets in EU Member States is under 6. The UK, Portugal, Luxembourg, France and Germany have employment figures above this average, whereas outlets in countries such as Italy, Spain, Greece, the Netherlands and Belgium employ fewer people than the European average. Denmark has an average of 6.1 employees per repair shop.

The share of very small companies (up to 4 employees) varies between 20% (UK) and over 60% (DK, F, GR, I, E). These firms make up between 15% (D) and almost 30% (I, E, F, DK), of all employees in the sector.

A smaller share of these very small companies acts as authorized repair shops for manufacturers. They already have considerable problems as investments in equipment for an authorized repair shop can amount to some DM 100,000 per workplace.

The considerable share of very small companies proves that the high density of motor vehicle dealers and repair shops is being maintained by customer behaviour. The neighbourhood repair shop apparently prevents development of larger motor vehicle companies. Trends in the size of repair shops differ greatly. In Germany, for example, the average repair shop size has decreased from 15 (1970) to 8 (1992) employees. In the UK, however, the trend is in the opposite direction. The considerable decrease in the number of outlets in the UK from 40,000 in 1974 to 22,700 today, has been accompanied by a trend towards larger repair shops and a greater but unknown number of small repair shops as part of the "grey" market. The predominance of very small repair shops has a considerable influence on the qualification requirements of employees; there is scarcely any division of tasks between employees. This type of all-round motor vehicle mechanic is predominant in very small companies with the exception of specialists employed in a few specialized repair shops.

Most of the workforce in the motor vehicle sales and repair sector are employed in small (size II: 5–9 employees) and in medium-sized repair shops (size III: 10–19 employees). One of the exceptions is Portugal where very small repair shops predominate (56% of all repair shops). Larger companies (sizes IV and V) have a share of 5.9% and 3.4% respectively. The latter, however, employ 56% of the workforce in the sector. The high employment density clearly indicates that larger Portuguese repair shops are facing remarkable structural changes. The larger repair shops (sizes III, IV, V) and a great number of smaller repair shops (II) are linked to the manufacturer by dealer contracts or are importers from manufacturers' subsidiaries. For the most part authorized dealers represent only one make. This is particulary true of countries with a high motor vehicle density.

The total range of companies show also characteristics which are specific of the countries. The existence of 4,500 "Fast-Fit Centres" in the UK – some of them authorized dealers – and the high share of "unofficial very small repair shops" indicate a considerable segmentation process in the UK sector. The Fast-Fit Centres, a while-you-

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wait service, focus on a large volume of trade with routine service items such as tyres, exhausts, batteries, oil change and regular inspections.

They are usually not model-specific. They offer a brand name service where customers may choose the items they want at a preset price (in UK).

There was a visible trend towards segmentation in the 80s in the European motor vehicle sales and repair sector. Apart from "Fast-Fit Centres", this is also true of specialized repair shops for bodywork or spraying (there are 700 such companies in the Athens area alone). General motor vehicle companies have, over the past 17 years, lost part of their business to such specialized companies. The latter offer parts and component repair work for simple tasks.

It is difficult to forecast if this trend toward segmentation will continue or if it will be reversed by a trend towards authorized dealers.

If the high-tech motor vehicle dominates in the coming years and if environmental requirements demand more stringent technical monitoring of vehicles, the relationships between manufacturers and dealers/repair shops will become even closer. This would result in an increase in authorized dealers/repair shops. Smaller non-authorized companies will only survive if they specialize in certain tasks.

The considerable decrease in authorized repair shops in the UK during the 80s had little influence on authorized repair shops. The number of these were not significantly reduced.

The European integration process and particularly the creation of a Single European Market, will reduce the role of importers. One can expect to see large scale sales and direct links between dealers and manufacturers. Such a trend is already visible in the UK Importing companies, which currently fulfil primarily a wholesale function, can be expected to play a more commercial role and offer dealers greater support in manufacturing and supervision (NL). A new group of companies is represented by motor vehicle leasing firms. They already account for 20% of the new motor vehicle market in the Netherlands. The appearance of these and other fleet owners has led to a concentration of purchasing power in the hands of a small number of consumers and to a weakening of the position of motor vehicle sales companies (NL). One-third of Dutch motor vehicle companies offered leasing arrangements in 1988.

3.2.3 The independent repair shops

Independent repair shops are mostly repair shops of size I. Motor vehicle sales is usually confined to secondhand vehicles. These companies are threatened from two sides:

- by the so-called "moonlighting companies" (black market); and
- authorized dealers and manufacturers.

Manufacturers make efforts to ensure that only their authorized dealers receive information via electronic data processing and technical documentation on service, repair and spare parts of their vehicles.

An additional problem is presented by regular updating of diagnostic software and the introduction of an end-of-line programming of testing equipment during motor vehicle production, thus making each motor vehicle an individual entity which can only be serviced and repaired with the aid of specialized manufacturer's software using a network link between manufacturer and repair shop. Vehicle repair and servicing by independent repair shops also entails risks for the customer as guarantee provisions of the manufacturer may then be invalidated.

On account of the lower economic potential of independent repair shops, one of the main problems is investment in new diagnostic equipment and improving repair service for new products. Independent repair shops are usually not permitted to participate in continuing vocational training at customer service training centres of the manufacturers.

A likely scenario for the future development of independent repair shops is portrayed in the sector studies and the case studies carried out in these repair shops: independent repair shops will take over repair of secondhand vehicles, they will become "Fast-Fit Centres" for simple repair work and routine inspection. To a certain extent a subcontracting structure may develop between authorized dealers and specialized independent repair shops (spraying, bodywork, etc.).

3.2.4 Mega-dealers

The mega-dealer concept is more prevalent in the U.S. A mega-dealer represents a number of makes and offers all kinds of manufacturer-related high quality service under one roof.

The high quality services of these companies and their economic strength imply a cooperative relationship with the manufacturer in comparison to the strictly supervisional structure prevalent in Europe. In European countries the mega-dealer concept does not yet play an important role. It is difficult to forecast whether this type of company will become a significant segment of the sector or whether manufacturers and importers, faced with changing domestic market structures in highly industrialized areas, will adopt the mega-dealer concept. Up to the present, the size of the company has not yet played an important role.

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Whether the possible modification of EU Regulation No. 132/85 in 1995 will influence the trend towards mega-dealers cannot be predicted. The Belgian sector report offers a possible scenario:

"If the EU would attach more importance to the requirement of free competition in the sector, this would lead to a profound transformation. Approximately 40% of all companies (in Belgium) would lose their privileged position. If the regulation would cease to be applicable the development would go in the direction of the mega-motor vehicle-centres already common in the U.S., i.e. several geographically grouped motor vehicle companies working together in order to offer customers at the same time motor vehicles and accessories, a car washing plant, leasing facilities, repair and maintenance services, etc."

3.3 The role and importance of the social partners in the EU Member States

3.3.1 How to establish a company

The legal regulations on establishing a motor vehicle company differ greatly within the EU Member States. This is attributable to the different traditions and government deregulation, but also to differences in the educational systems.

Countries with stringent regulations are the Netherlands, Germany and Luxembourg. In Luxembourg and Germany a master craftsman certificate is required for opening a motor vehicle company. This certificate requires sound initial vocational training.

The traditional concept of master craftsmanship is closely linked to the training concept of apprenticeship in a master craftsman's repair shop. This concept is common to those countries practising forms of dual vocational training and in which training roots go back to handicraft apprenticeship. Apart from knowledge and skills relating to motor vehicle technology, would-be master craftsmen are also trained in company management. In the Netherlands, the proprietor of a motor vehicle company must acquire two certificates: one, the Motor vehicle Industry Proficiency Diploma, and two, the Small Business Diploma. The employer organizations insist on legal provisions to govern industrial technology and the joint regulations for motor vehicle, bodywork and tyre servicing companies. Other certificates are required for opening a company for routine inspection or for motor vehicle demolition. Official approval for inspection repair shops is necessary and can be obtained only if the company employs a person with a master's certificate in motor vehicle inspection. These requirements are common to Germany and Luxembourg.

EU Member States with a long tradition of school vocational training, have very different regulations concerning the establishment of companies. In these instances, certificates from specialized colleges and universities are of great importance. Greece, for example, determines that companies of a certain size (more than 25 employees) must employ an engineer with a qualification in this field. Small companies have regulations defining a total of 14 categories of occupational practices. In order to qualify for one of these categories, a candidate must prove one to four years practical experience and have a certificate from a technical school or comparable initial training. This regulation covering 14 different fields of activity within the motor vehicle sector is special in nature. The majority of EU Member States have a less differentiated division of tasks (a maximum of 4 fields) in the regulations. This degree of differentiation reflects the large number of specialized repair shops. Greece also has the highest degree of specialization in its repair shops. Concerning the trend towards high-tech motor vehicles and integrated technology, the specialist certificates have already shown themselves to be outdated.

The UK has a particularly small number of regulations governing independent repair shops and tends more towards self regulation than detailed government provisions. Standards are usually set by the manufacturing and dealership networks for authorized dealers. The UK standard (BS 5750) plays an important role for companies in motor vehicle sector.

> "Out of direct training itself, the most significant force for change in the sector has been the BS 5750 accreditation, a government standard of quality which has primarily been applied to manufacturing establishments but is increasingly being found in retail and service applications. To attain BS 5750 a company must first establish quality targets, then specify the measures to be used to attain these targets, and finally prove to the inspectors that the measures proposed can actually be deployed in practice. For many corporate and governmental customers the possession of BS 5750 is a prerequisite to the award of a contract or business" (UK, Sector Report). The BS 5750 accreditation will become increasingly important in the future. DAF, for example, is choosing its dealers on this basis. Another important element is a detailed training plan for the company and its employees. (UK, Sector Report)

Apart from the qualifications of the owner and his employees, requirements in the management of motor vehicle companies relate to the following aspects:

- road safety and motor vehicle safety
- environmental standards.

A higher and more harmonized level of regulations for all EU Member States is to be expected.

Adherence to such standards will certainly influence the size of motor vehicle companies. Smaller sized firms (size I), will have difficulty in investing in the equipment necessary to comply with the rules and standards in the future. In the absence of interim regulations, the transition towards quality service will not be feasible for a number of companies. For example, 80% of Greek repair shops are confronted with the problem that they are operating on a temporary license as their repair shops do not comply with the regulations on repair shop requirements. These temporary licenses expired in May 1993.

In addition to the regulations on establishing repair shops, there are no additional legal provisions for a number of countries (e.g. DK, IRL, P). Any one is at liberty to set up a business. There are no requirements with respect to training background and no authorization is requested. This is, however, only applicable to independent repair shops.

As far as motor vehicle make repair shops are concerned, the approval of the manufacturer – franchising rules in franchise networks – is required. The conditions vary from make to make. Each trade name, however, maintains its own standards. One of the most important prerequisites throughout the EU Member States is membership of a trade association. A certain level of training, equipment and working conditions are also required.

3.3.2 Social conditions for the workforce

The provisions and collective bargaining agreements which make provisions for the social and economic working conditions in the motor vehicle sector differ greatly and cover the fields of:

- wages and salaries;
- health insurance, health and welfare;
- pension plans;
- staff classification and minimum salaries; and
- sanitary facilities and repair shop hygiene.

Wages

Wages in the motor vehicle trade are lowest for motor vehicle repair shop staff and highest for sales personnel in motor vehicle sales as they are frequently granted sales commission in addition to their salaries. The level of salaries and wages depends mainly on the influence of the trade union carrying out negotiations. When collective bargaining agreements are negotiated by strong trade unions, the level of wages and salaries will be higher than in cases where highly specialized branch trade associations act as parties to the collective bargaining agreement (cf. E, F). Here the differences have major implications as the degree of trade union organization is small on account of the large number of small and very small repair shops.

The level of wages and salaries and the influence of trade unions are, however, not negligible on account of the fact that they foster qualification standards and qualification systems. Lower wages usually impede improvements to qualification standards.

Working hours

In many countries, working hours are very flexible on account of the distinctly informal character of very small companies employing a considerable share of family members. Overtime work and work on Sundays is quite common where the need arises. In certain countries, this is even provided for in legal regulations and collective bargaining agreements on working hours. Greece and the UK, for example, permit work in certain regions on Sundays. In the Netherlands, with a traditionally high level of social and labour legislation, flexibility of working hours in general is being considered at present. Other countries such as Portugal maintain a 44 hour working week.

In all EU Member States, total weekly working hours are regulated by law or on the basis of collective bargaining agreements between the social partners. Working hours are highest in Portugal (44 hours per week) and lowest in Germany (37 hours per week).

A model of good practice is the "national convention collective" (F, Sector Report) making provision for total working hours, overtime (must be paid at a higher rate of 125%), nightwork, work on Sundays and flexible working hours. Similar provisions exist in Luxembourg, collective labour agreements between the employers' federation (FEGALUX) and the labour union (UGBL and LCGB), in Italy, law 426, Greece – National General Associated Working Contract, and Spain – workers' statutes.

Generally it can be concluded that the total working hours in EU Member States are regulated by law. However, opening hours, overtime and flexibility of working hours are treated differently in each country.

In Greece, no benefits are paid for *overtime* (GR), nor in Italy (i.e. Sector Report). In most other countries (D, E, I, IRL, F), overtime is paid at a supplement of 25%.

Opening hours also differ from country to country and between regions and repair shops. With the emphasis on customer satisfaction, repair shops are offering different models of opening hours. Some provide a 24-hour breakdown service, others offer opening hours from 7 am to 7 pm in order to reduce peak hours and to offer the customer greater flexibility. This model calls for a sort of shift system (D5) or for *flexible working hours on the part of employees.*

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Models providing seven-day opening are customer- but not workforce-orientated: "staff work five days on, two days off in a shift rota system to enable the company to open seven days per week" (UK 1).

It must be pointed out that throughout EU Member States there are divergencies from standard agreements on working hours in order to extend the company's working hours and to comply with customers' wishes. The high rate of self-employment, the large number of family members employed in the sector and the large share of small-sized companies (size I) favours flexible opening hours.

Collective bargaining agreements

Concerning labour legislation, the Dutch "Working Conditions Act" is clearly of an exemplary nature. Some highly innovative provisions have been made in the direction of promoting well-being. "A number of recently introduced articles relating to well-being at the workplace require employers, among other things, to take account of the qualifications and the potential for developing qualifications of their personnel when organizing work, installing work places and defining production and work methods. Employers must take account of the workers' personal qualities including their professional skills when defining and allocating tasks. The work to be carried out by an employee should, as far as possible, contribute to improving his or her professional skills. All motor vehicle companies are subject to this legislation" (NL, Sector Report). One of the intentions of this legislation is to reduce the number of persons reporting ill.

For the first time, this regulation focuses on the qualifying potential of work itself as the cornerstone of legislation fostering qualification within labour law. This new legislation must be stressed as normal legislation and collective bargaining agreements in the EU Member States usually provide work classifications based on a high degree of horizontal and vertical division of tasks. Thus, the UK system of National Vocational Qualifications (NVQ) defines four levels of qualification:

Level 1: Competence in the performance of a range of various activities most of which may be routine and predictable.

through

Level 4: Competence in a broad range of complex, technical or professional work activities ... with a substantial degree of personal responsibility and autonomy.

Levels 2 and 3 lie between these two levels, e.g. complex and non-routine activities with some (level 2) and considerable (level 3) responsibility. Other EU Member States such as Germany and Luxembourg just distinguish between skilled workers and master craftsmen. Apart from master craftsmen, a technicians' level is developing at present, showing a different profile of tasks. The differences in the horizontal division of tasks are even more remarkable than those of the hierarchical division. They range from two professional levels in Germany to fourteen in Greece.

Social funds

Luxembourg has a well-organized funding system with good perspectives. The Chamber of Trades manages a fund for training in and creation of businesses. The Chamber receives contributions from the craft trades sector calculated on a profit basis. A certain percentage is fed directly into a fund which bears the costs for installation and operation of an entire continuing vocational training infrastructure; "at present the social partners are formulating the directive for the future framework law to make provision for access to/and financing for continuing vocational training, protection of investment for continuing vocational training ventures, as well as issues relating to certification" (L, Sector Report).

The Chamber of Trades formulates and implements a number of continuing vocational training courses and supports the development of companies and of employment. Advance courses are offered in motor vehicle electrics and electronics. Success in these courses is rewarded with a small percentage rise in salary. This can be characterized as an example of good practice.

A similar fund also exists in Belgium (B, Sector Report). 0.25% of the wages bill in each sector is spent on providing training and employment opportunities for what are termed risk groups. "All full-time employees in the private sector can take advantage of this scheme. Under certain conditions these employees can claim paid leave of absence to take part in training courses" (Sector Report). A similar proviso also exists in Denmark, but the degree to which this is implemented could not be ascertained.

A fund for financing training also exists in the Netherlands (NL, Sector Report). This fund reimburses costs for staff training incurred by employers.

The agreement governing the fund is determined by the collective employment agreement (CAO) of the Social Partners (BOVAG, NCBRN, FNV, CNV, UBLHP) and includes provision for day release for training purposes. This training and development fund has existed since 1990 and is financed by a government grant and the income generated by CAO contributions from within the sector (0.55% of total salaries). This fund is a form of cooperation between employers and employees, aimed at improving professional skills in the sector. Employers are represented in BOVAG and NCBRN, the

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employees in the trade unions, FNV, CNV and the UBLHP. Representatives of these various organizations form the management committee of the fund. The OOMT is responsible for major decisions on training policy in the sector. Policy is formulated and implemented by INNOVAM, which organizes "courses, training and exams which are recognized by the sector and state..., and it provides a broad range of courses and training in fields such as management, electronics, the environment and commercial skills" (NL, Sector Report). This fund operates successfully and can be regarded as an example of good practice.

In France there are similar fund provisions. The latest version, the national inter-professional agreement of 3 July 1991, on continuing and in-company vocational training encompasses the following aspects:

- a contribution of 1.5% to be paid by companies with more than 10 employees as of 1 January 1993.
- Companies with less than 10 employees pay 0.15% of the total wage bill.

These contributions are used to finance training and all employees have a right to training leave. No information exists on the success of such a model. Ireland reported that the Irish Congress of Trade Unions received funding from the FORCE programme for upgrading skills of its members. The course is designed for engineering workers. At present the unions are represented on all the engineering committees and are seeking financial support for the motor vehicle sector.

A collective agreement on training leave for at least one week a year exists in Denmark and Germany (see Sector Reports).

3.4 Employment and labour

3.4.1 Conditions of employment

Conditions of employment are influenced by a number of factors and the more important aspects will be discussed in the following.

- Image of the sector

It is apparent from all sector reports that the image of the motor vehicle sales and repair sector is not the best. The opinion prevails that work is dirty and wages are low. The sector has a negative blue-collar image.

In many countries (D, DK, NL, B, IRL, UK, L, F, E) numerous activities have been launched to improve the sector's image: special allowances in addition to basic wages, the creation of foreman positions, introduction of workplace consciousness. These incentives are crucial as recruitment of skilled staff has become difficult in a number of countries. Although the motor vehicle sector in most countries is actively involved in attempting to raise the standard of initial and continuing vocational training, there is a shortage of skilled manpower. This is accounted for both by the sector's poor image and by economic and demographic trends.[5]

- Employment contracts

The motor vehicle sales and repair sector is an important full-time employment area. The number of part-time workers is estimated to be less than 5% throughout the European Community. Only some countries report higher rates (9% – B, Sector Report). Furthermore there are no reliable figures on working hours of owners and family members employed in the company. It may be assumed that owners are working at least a full week, whereas family members employed in the company usually work part-time.

- Promotion prospects

In general, the sector offers poor promotion prospects for the workforce. Experienced and well-trained workers are attracted to other sectors and are inclined to leave the motor vehicle sector. The introduction of the profession of Service Technician in Germany – following further training amounting to 200 hours – is a good example of how to grant promotion prospects for the younger workforce. Upon successful completion of training workers have the opportunity to take over foremen positions in the service and repair sections of companies. Promotion aspects and opportunities would also help to increase the image of the sector.

- Social context

Employment in the motor vehicle sales and repair sector is also dependent on the economic prosperity of motor vehicle manufacturers. In terms of numbers there has been growth in employment in the sector in most EU Member States over the past decade. This growth is expected to level off within the coming year as a result of declining motor vehicle sales, technological innovation, improved motor vehicle quality, a reduction in repair shop hours (less maintenance, longer servicing intervals) and an increase in business productivity. On the other hand, new environmental legislation which is being formulated at present could have positive implications for the employment situation.

[5] In Germany and Luxembourg, for example, a decreasing population and a differing choice of occupations by young people are a source of the shortage of potential apprentices which is hampering recruitment.

3.4.2 Recruitment conditions

Recruitment policy varies greatly within the EU Member States. Recruitment is greatly influenced by the image and the quality of initial vocational training. In countries with apprenticeship training systems or specific youth training schemes (for example, UK) trainees are normally offered a working contract when a job arises provided the management of the company is satisfied with the quality of work, the motivation and behaviour of the employee (L, D, Sector Reports). In other countries where initial training fails to provide workers with adequate qualifications (for example, Spain, Greece, Italy and Portugal) other criteria are more important.

The following recruitment criteria can be identified:

- in countries with good initial vocational training the most important recruitment criteria for young workers are formal qualifications, i.e. a particular skills level and specialization, for example, electronics skills (case studies on DK, D, F, B, L).

- In countries without an initial training scheme or in which the quality of initial training varies greatly, criteria such as work experience (F, E, IRL), personal situation (married, single, plans for the future, family life)[6] (UK), work motivation and motivation to undergo continuing training (B), character (GR), knowledge of foreign languages (GR), and company loyalty are important criteria in recruitment.

- Further criteria for recruitment are family relationships (son or daughter of the owner, owner's wife), recommendations and at times the level and quality of secondary school qualifications.

A number of cases report that

- the level of qualification of the workforce following initial training does not correspond to the level required to carry out tasks in the company;

- there is a shortage of qualified workers in a number of countries (NL, F, UK, P, B, L, IRL). A shortage of highly qualified manpower is stressed in the reports on Ireland, Luxembourg, Germany, France and the Netherlands;

- it is difficult to attract staff with a higher level of education. This is partly due to the sector's image (NL, D). The motor vehicle sales and repair sector has a comparatively low status compared to related sectors.

- the assembly industry absorbs qualified workers (IRL, D, B).

Applicants' age does not play an important role in recruitment for two reasons:

- the average age of the workforce in the sector is relatively low, and

- older workers – over 35 years of age – are less likely to leave companies or leave the sector.

Newly recruited staff is the important potential for special continuing vocational training for example, to improve qualifications or to make training product-oriented.

3.4.3 Personnel structure

The personnel structure in the motor vehicle sales and repair sector reveals dominant characteristics:

- the sector is a typical male area of occupation;

- the sector employs relatively young people;

- the level of manpower fluctuation is comparatively high;

- the sector employs few disabled workers;

- an insignificant number of foreign workers are employed in the sector.

Dominance of men

The maximum share of females in the sector is 18% in Germany. In Denmark and Belgium they represent 16% of the workforce and on average between 2 and 12% in other EU Member States.

Usually, females are employed in secretarial duties, in service and administration. In repair shops and management, the share of females is less than 1%. Only two cases (F, B) report women at managerial level. Some cases report that women are working in the sales department. There has been no significant increase of female employment in the sector in recent years. There are no initiatives to increase female employment in the sector.

High rate of comparatively young people

Concerning the average age of the workforce in the EU Member States[7] the average age of staff in the motor vehicle sector is relatively low. Analysis of the age structure in the case studies showed that approximately 28% of the workforce is younger than 25 (in Denmark and Germany

[6] These criteria are certainly not representative and contradicted labour legislation in the United Kingdom.

[7] It is, for example, expected that more than half of the German workforce will be older than 50 in the year 2000.

about 32%) and approximately 60% is younger than 35. The percentage of the workforce over 45 years of age is estimated to be some 18%. Many of these are owners of repair shops. On account of a shortage of junior staff, the average age in Italy and Spain seems to be a little higher, but this does not have a significant influence on the structure as a whole. Where the workforce is older, the manpower has been employed by a specific company for a long period of time and is highly experienced.

High level of manpower fluctuation

The poor reputation of the sector (NL, Sector Report), the low salaries compared to other sectors (F, Sector Report) and poor prospects of promotion as well as difficult physical working conditions are the reasons given in the studies for the comparatively high fluctuation of manpower in the sector. There are no detailed figures on this except for Denmark: "Over a period of six years in the mid-80s only one half of motor vehicle mechanics employed remained within the motor vehicle sector". (DK, Sector Report). In Germany an estimated 50% of workers who trained for the sector leave within 5 years of qualification either on account of unemployment or because they are interested in applying their skills to other trades. France and Luxembourg also report very high fluctuation rates. Other countries mention fluctuation as a loss of skills in the sector.

Low rate of disadvantaged workers

In a number of countries regulations and provisions promote disadvantaged workers (disabled, long-term unemployed, immigrants, etc.), to facilitate entry into the motor vehicle sector. Some of these regulations (E, Sector Report) stipulate employment of 2% disabled workers in a company with more than 50 employees. The situation is similar in Italy where existing laws do not apply to small companies.

In Belgium, an agreement between the Flemish and Walloon Employment and Training Services and the sector regulates the so-called 0.18% to 0.25% funds since 1990. This agreement states that the private sector should provide 0.25% (since 1992) of total payroll to employees in order to promote employment initiatives on behalf of risk groups. The intention was that at least 0.10% should be spent on the most vulnerable groups on the labour market.

The Netherlands and the United Kingdom have also launched initiatives to favour disadvantaged groups in the motor vehicle sector. Basic and practical training is provided to integrate them. According to figures in the Sector Reports of the various countries, it can be concluded that disadvantaged groups do not play a significant role within the sector. There are a variety of reasons for this:

- work in a repair shop is difficult;
- a high level of qualification and skills is required for all tasks;
- integration is difficult in small-sized companies (size I and II); and
- laws do not take into consideration the size structure in this sector. Few companies have more than 50 employees.

Discussions with companies practising the teamwork concept showed that this offers an opportunity for integrating disadvantaged workers.

Low rate of foreign workers

The number of foreign workers employed in the sector is comparatively low, with the exception of Luxembourg.

In Luxembourg, approximately 45% of the workforce are foreigners of different nationalities (Portuguese, Italians, French, Belgians, Germans). They are employed mainly in the maintenance and repair sections and to a lesser extent in sales and administration.

Italy reports a maximum share of 18% of foreign workers. Case studies for other countries reveal shares of 8% and less.

3.4.4 Job structure

Up to the mid-80s the job structure in the motor vehicle sales and repair sector was stable. Since the end of the last decade changes have commenced. Requirements have become more varied in comparison with the past: technology is becoming more complex, motor vehicles are becoming computerized and the diagnostic equipment has been changing towards expert systems. In addition, there is a need for communication using different media (manuals, microfilm, PC, CD-ROM, a variety of tables, technical regulations, diagnostic equipment and safety regulations). This has created the need for a broad range of skills in the workforce and has led to a new job design. The workforce has to be prepared for these varied tasks. Some manufacturers have already created new informal career categories:

- BMW's Service Technician, or
- Toyota's High-Tech Master Technician.

Some trade associations are pursuing the same trend. These issues will be discussed further in Chapter 4.

Source: Bosch

Electronics in the motor vehicle

4. CHANGING TASKS IN THE REPAIR SHOP AND ITS IMPLICATIONS FOR SKILL REQUIREMENTS AND THEIR FURTHER DEVELOPMENT

In the case studies and the sectoral survey, the discussion of changes in occupational profiles in the sector is of great importance. Ideas on the future tasks in the repair shops are influenced by the various perspectives. This chapter is devoted to an in-depth discussion of changes in occupational profiles and their implications for skill requirements and training.

Today's high-tech motor vehicles and future developments will lead to radical changes in this sector. On the one hand motor vehicle technology which increasingly represents integrated systems technology will result in a change of tasks and on the other the development of computerized testing and diagnostic equipment will have considerable implications for tasks in the repair shop. In addition to these a number of factors influence repair shop tasks – for example, EU regulations, technical standards, customer relations, customer behaviour, workplace awareness (UK, Sector Report).

The issue of enabling the workforce in the sector to cope with current and future needs is a very broad one. One aspect of these issues relates to technology:

- are highly specialized or multi-skilled all-round mechanics necessary?
- are mechanics with a sound background in electronics required?
- does the solution lie in creating an electrician-mechanic profile (e.g. a motor vehicle mechatronic)?

Another dimension relates to *quality service* and corporate culture:

- does the future require a repair shop workforce to establish total quality systems based on active involvement of all employees in a comprehensive workplace culture (UK, Sector Report)?
- how can quality of service and customer relations be achieved?
- how can, besides skills, commitment of the individual be improved to attain greater performance?
- how can the workforce ensure a complete range of services?

These issues will be discussed further and perspectives identified. A number of different aspects form the framework for discussion. The discussion takes into consideration a work-oriented position. Technology itself is not the main area of discussion but technology from the point of view of the work process in the sales and repair shops.

This approach should help to identify contradictions concerning the development of future tasks and requirements in the sector in the case and sectoral studies in the EU Member States. The arguments put forward in the reports vary. Some demand highly qualified workers, some less qualified and highly specialized staff. The formulas propounded for customer relations and customer satisfaction are numerous. There is unanimity that there is need to further improve the quality of service.

4.1 Tasks are changing

Diagram 3.4 in Chapter 3 shows the density of motor vehicles per person employed in the motor vehicle sales and repair sector. The figures serve as a yardstick for the level of activity in the sector throughout the EU Member States. The grouping of the countries in the matrix (Table 3.3) provides in-depth information on potential to *improve productivity* of repair shops in the various countries by means of rationalization. As described in Chapter 3.2, major structural changes in repair shops are expected particularly for area IV (GR, P). Changes in employment rates are also expected for area III (DK, L, F, E).

Any kind of change will influence repair shop productivity as a result of rationalization. This means that in addition to the many other changes in progress in countries belonging to area III and IV, each employee will have to attend to a greater number of motor vehicles in the future. This will be made feasible by development of the sector towards less maintenance and rationalization in the field of maintenance and repair work. Motor vehicle inspection times have already decreased from three hours to about one hour on average over the past 30 years. The same tendency can be noted in times for repair work which is increasingly being reduced to merely changing parts. A trend towards the motor vehicle requiring less maintenance and repair will continue as competition focuses on this process. This development will lead to greater complexity in motor vehicle technology and to a greater number of electronically controlled systems. This is one of the major factors prompting changes to job profiles in the repair shops (cf. Sector Reports of B, D, DK, E, I, IRL, NL, UK).

The core of new technologies are networks which interlink the system-components. This renders motor vehicle technology extremely complex with the result that currently a motor vehicle may be viewed as a "service-unit". Usually, this unit is repaired in one single repair shop.

The major tasks of the repair and service work will be described relating to the main areas of activity in repair shops:

- Inspection/Maintenance

Engine: exchange of filters and oil after long intervals, checking and adjusting ignition, changing spark plugs, inspection of spare parts;

Gear box: inspection of gear box, monitoring function and smooth running; oil check;

Brakes: function and pressure check, leakage test, checking tubes for damage, checking and replacing brake linings, pipes and tubes;

General: visual check of engine; check of underbody, of suspension and analysis of exhaust fumes.

- Mechanical work

Steering: function check, safety check;

Suspension system: optical and electronic adjustment;

Engine: replacement of engine (completion engine, parts of engine), replacement of cylinder heads, valves;

Gear box: repair of mechanical gear boxes, replacement of automatic transmissions;

Brakes: replacement of brake blocks or discs, master cylinders, conduit systems, callipers; replacement of brake fluids, function test on brake bench;

Underbody: replacement of steering parts, shock absorbers, suspension.

- Electrics/Electronics

Function check on aggregates and components;

Function checks on all types of electrical/electronically controlled systems with diagnostic equipment;

Application of programmed trouble-shooting and replacement of defective components;

Application of modern testing and diagnostic devices to more complex systems.

- Body work

Panel beating, zinc coating, improvements, inert gas arc welding, panel cutting with special tools;

Use of frame straightening bench, new panel beating and straightening tools, devices for inert gas arc welding, grinding instruments, gauges;

Use of special assembly and dismantling techniques

Application of new paint spraying techniques.

In a number of case studies (e.g. IRL, D, DK, E, B), the division of tasks within the four fields and changes in these tasks are discussed. The conclusions drawn in the studies differ. It is, however, accepted and recognized that new motor vehicles require less maintenance and traditional repair work and that their components last for longer and are more likely to be replaced entirely (E, I, Sector Reports).

> "Many of the traditional specializations (carburettor, radiators ... to some extent electrics) are progressively loosing significance while a new occupational profile is emerging in the repair shop, a profile that will cover more functions and is more based on electronic skills rather than traditional mechanical knowledge " (I, Sector Report).

Some of the case studies (NL, UK, F, IRL, D, B, E) stress the reduction in the quantity of mechanical repair work and the reduction in maintenance tasks – i.e. replacement instead of repair of parts. They also stress that the volume of work in electronics is not as great as was to be expected from the broad application of electronic equipment in new motor vehicles.

The studies draw the conclusion that the increase in the replacement of damaged parts instead of their repair and the greater intervals between inspections may be viewed as "lean service" and greatly influence the task of mechanics in the repair shop. This development will be discussed in greater detail from a variety of perspectives.

Against the background of changes in tasks in the repair shops on account of the introduction of new technological systems since the mid-70s, the increasing variety of models as a result of quality competition and stronger orientation towards the customer has been discussed in an in-depth survey (Rauner/Zeymer, 1991, p. 61–67). The main findings of this survey will be revealed later on in this report (cf. D, Sector Study).[8]

[8] The case studies did not focus on changes in the work. Reliable observations can only be produced by studies over longer periods. Rauner/Zeymer have presented an in-depth study of this process.

The survey examined the four fields of activities mentioned above.

The area of mechanical equipment was split up into six repair tasks:

- brakes
- shock absorbers
- exhaust systems
- gear box systems
- engines
- clutch systems.

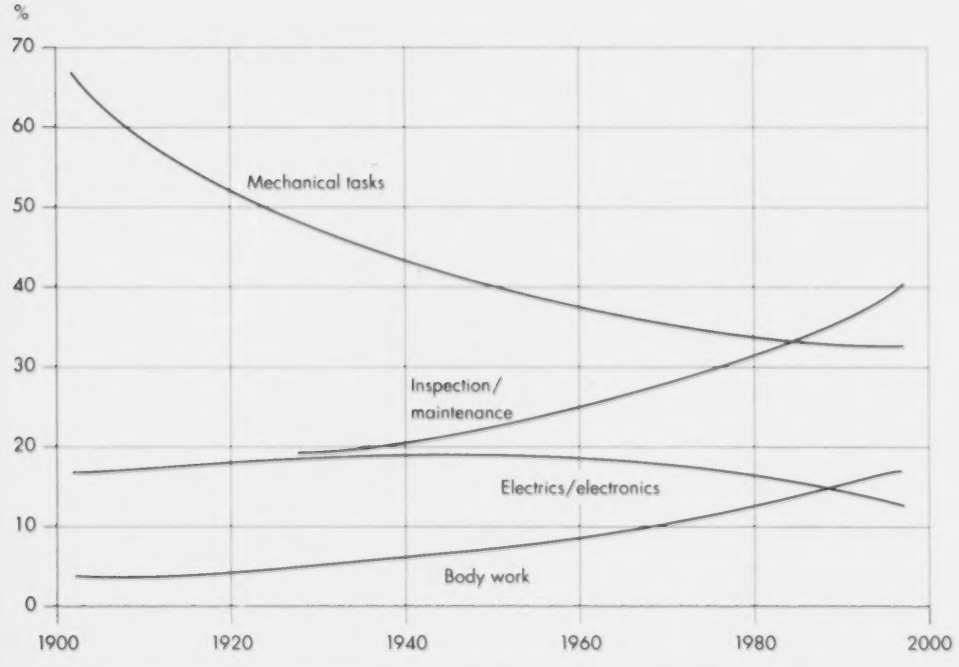
Such a division of activities allows comparison with other surveys which have focused on structural changes in the sector. The subdivision of the mechanical field also permits a detailed survey of changes in skilled work over a longer period of time.

In comparing the division of tasks of the repair shops studied with task development over the past 30 years, some characteristic tendencies can be identified (Diagram 4.1). During the 80s, the previously dominant field of tasks "motor vehicle mechanic" has fallen into second place (35%) behind the field of "motor vehicle inspection" (37%). This shift took place despite the fact that intervals between inspections have increased considerably and inspection time has shortened on account of almost maintenance-free technology and powerful diagnosis technology. This means that even more considerable improvements have been achieved in motor vehicle mechanics and repair. The main fields of activities in inspection/maintenance – motor vehicle mechanics – motor vehicle electrics/electronics and bodywork have undergone changes in tasks in favour of inspection and motor vehicle bodywork.

The traditional work of motor vehicle mechanic as well as the area of electrics/electronics has decreased in significance.

Observation of this development by Rauner/Zeymer (cf. D, Sector Report) over a lengthy period of time indicates that emphasis in the motor vehicle repair shop, regardless of work content within the four fields of activities, has undergone a basic shift. The area of motor vehicle mechanic which dominated all fields of activity up to the mid-60s and had accounted for 80% of all tasks in motor vehicle repair shops during its creation phase at the beginning of the century, has lost its dominant position during the 90s. Inspection as a preventative measure of motor vehicle maintenance (cf. I, Sector Report) will predominate although it developed much later, i.e. in the 30s. Surprisingly enough, the growth of electrics/electronics in the early decades of this century has decreased slightly since the 60s despite of the rising share of electronics in motor vehicle technology. Comparatively few *opportunities for rationalization* in motor vehicle body repair work, the number of accidents and the comparative increase in the secondhand motor vehicle market

Diagram 4.1 – Development of division of tasks in the motor vehicle repair shop



are the most crucial factors accounting for continued growth in motor vehicle body work.

It is interesting to note that in some countries with older motor vehicle fleets (P, D), the studies did not report a higher demand for continuing vocational training. A high volume of mechanical tasks still have to be carried out. The skilled workers available are qualified to undertake these tasks. On the contrary, Denmark, Ireland, Spain and Italy which have older motor vehicle fleets, report a need for training in modern technologies.

The decrease in tasks in electrics/electronics reconfirmed the findings of a number of case studies. In the Dutch case studies, interviews with repair specialists come to the conclusion that knowledge of electronics and diagnostic systems should be improved. However:

> "the problem with electronics ... is that you hardly ever have any faults. The electronics rarely break down so that you do not get any work experience" (NL, Sector Report).

> "in the context of their training or in-service training ... mechanics have acquired the knowledge required in this field... The problem is, however, to acquire sufficient experience in practise due to the fact that electronics rarely break down" (NL, Sector Report).

In other words, electronics make it essential that a repair shop is able to operate in this field. The number of tasks are, however, only marginal compared to the overall activities. Profitability is therefore low (F, Sector Report). Consequently, productivity would have to increase through application of advanced diagnostic equipment. Work organization must bear in mind this development of tasks.

Comparing the repair shops contained in the study by Rauner/Zeymer, it is obvious that there are few differences in tasks relative to the size of companies. Significant irregularities within the range of tasks have more to do with the motor vehicle make or with specialization within the companies.

Only through considering a large number of random samples in this survey of company-specific differences in the range of tasks in the motor vehicle sector, does this reveal characteristic differences between large and small companies (Diagram 4.2). Only mechanical work is being carried out by companies of all sizes. In all other fields of activity there is a more or less marked tendency towards offering the full range of maintenance and repair services carried out at specialized work places by skilled staff. Among companies with up to 9 employees, this field of activity accounts for less than 10%. It is interesting to note that though motor vehicle electrics/electronics increases in importance with the size of the company, it represents just under 60% of motor vehicle electrics in motor vehicle repair shops. There is no tendency towards specialization of repair shops in motor vehicle mechanics or in motor vehicle electrics. The case studies (IRL, D, DK, NL) and the sector reports (D, DK, B, NL, F) underline this point. Sophisticated specialized repair shops concentrate mainly on tasks related to repairing specific components requiring very specific skills and knowledge or even authorization from the producer or even the government. Another kind of specialization can be found in replacement repair shops dealing with simple parts such as exhaust systems, shock absorbers, etc. Tasks in these repair shops are simple manual ones. It is surprising that not all motor vehicle repair shops assign maintenance and inspection to specially trained skilled workers. This phenomenon increases with a decrease in the size of the repair shop. This does not mean, however, that more than 30% of the companies in category III (10–19 employees) do not offer maintenance inspection. This is due to the significantly lower degree of the division of labour in smaller repair shops.

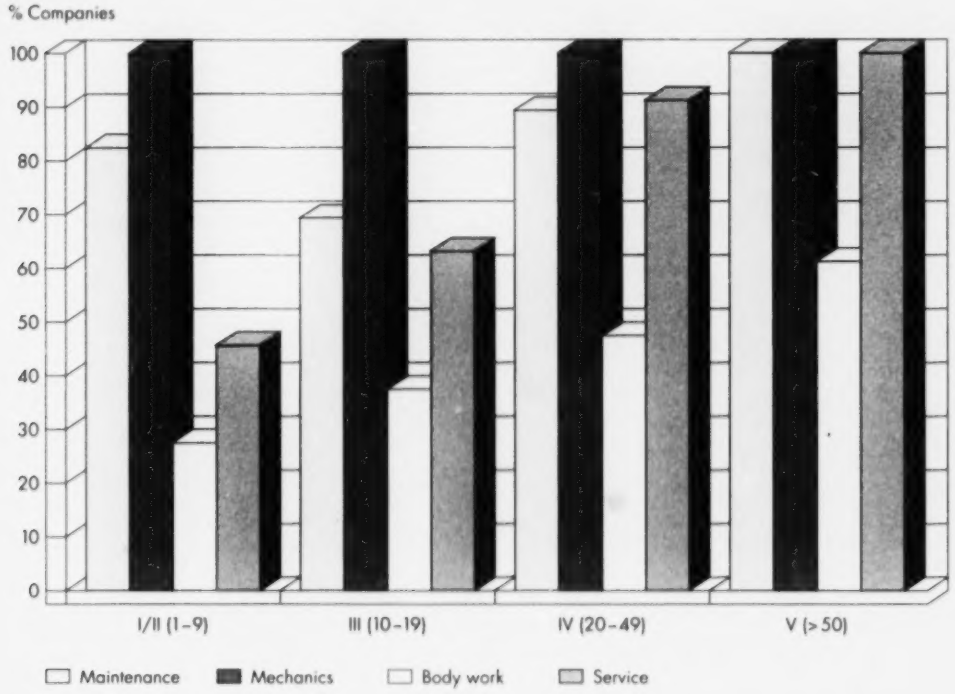
The significant increase in motor vehicle cleaning with the growing size of companies is due to secondhand motor vehicle sales which are closely linked to the sale of new motor vehicles. Secondhand motor vehicles must be resold by the dealer who concentrates on care of secondhand motor vehicles. The larger the company, the greater the concentration on the sale of new motor vehicles and thus the trade-in of secondhand motor vehicles. Maintaining the value of these vehicles results, with growing size of companies, in additional tasks and a larger share of skilled workers.

Conclusions

In order to fully comprehend the extent of change in tasks in the motor vehicle sales and repair sector, a number of findings should be considered:

- Mechanical motor vehicle and repair work has decreased more than sixfold between 1950 and 1989.
- This has resulted in a shifting of tasks marked by a comparative increase in inspection/maintenance and bodywork and a decrease in motor vehicle mechanics and electrics.
- The increased use of electronics in motor vehicles is inversely proportional to the quantity of electrical and electronics work.
- Complex system technology, controlled by electronics, makes diagnosis an essential part of the work of a repair shop (B, D, IRL, DK). Correct diagnosis of complex and rare problems is important.

Diagram 4.2 – Places of work in motor vehicle repair shops classified by size category



This shifting of tasks has resulted in a transfer from mechanical work and from practical repair work to computer work with diagnostic skills of prime importance (IRL, NL) combined with the necessary maintenance tasks. Bodywork continues to play an important role.

The decrease in mechanical work and electrics and electronics makes it easier to *rationalize* work in the repair shop as time consuming repair work no longer has to be carried out.

Repair work in the field of motor vehicle bodywork is becoming increasingly standardized. An international database, AUDATEX, located in Muenster, Germany, contains the prices of components, possible repair times, configurations for repair sets of 220 models and 11,000 manufacturing versions (B). Efficiency of repair work is increasing constantly. This will inevitably lead to *higher productivity* and thus the concept of *lean service* playing an increasing role in this area.

These findings show that a fundamental and unique change in tasks has occurred in the motor vehicle industry which effects both the individual skilled worker and the repair shop. The motor vehicle mechanic and associated technology which had dominated the motor vehicle industry since its beginnings, has lost ground and an independent motor vehicle sector has formed. The field of service and maintenance which did not exist in the beginnings of the motor vehicle industry has developed to become the dominant sector. Nowadays, service and maintenance support motor vehicle sales rather than being part of the traditional motor vehicle repair shops. The modern repair shop clearly reflects this change in tasks. It is specialized in diagnosis and maintenance rather than in the chemical work which accounts for just 10–15% of turnover of medium and large companies. The case studies and the sector reports show, however, that this does not reduce its strategic importance for a flourishing motor vehicle trade. On the contrary, only quality service, i.e. productivity and a high standard of service with intense customer relations, will assure growing market shares.

This again reflects the composition of employees in the motor vehicle industry. Some 50% and more of the staff of medium and large companies are working in the repair shop or are assigned to it. Another important interim finding is the large discrepancy between the increased use of electronics in motor vehicles which continues unabated and a tendency to reduce the amount of this activity in repair shops.

These developments culminate in new and continually changing requirements for individual workers in the repair shop;

- in recent years there has been little change in the skills required for mechanical work, inspection and maintenance. Ongoing continuing training is, however, necessary for working with new products, for example, new adjustment procedures, new information on adjustment data, new materials, new jigs and new tools.

- As for maintenance and repair of highly developed electrical and electronics technology, employees must be in a position to work with the most modern and expensive diagnostic equipment. Where interactive diagnostic equipment is used, highly qualified employees must be available to handle the equipment (including test and diagnostic programmes).

These *core tasks* require technical and general knowledge and the ability to analyze and interpret the diagnostic findings (B). While actual repair and replacement of components is fairly simple, the repair of systems is a difficult task. There is need for a new occupational profile to do justice to these tasks and challenges.

The following chapter examines how the changes in a number of criteria can influence changing requirements in the repair shop and what trends the future is likely to bring.

4.2 Changing tasks are influenced by a number of factors

The changing tasks described in Chapter 4.1 are mainly as a result of quantitative changes in the four fields of activity, i.e. mechanical work, inspection and maintenance, electrics/electronics and motor vehicle bodywork. In addition to these, there are also *qualitative changes* in the working process, the origins of which are to be found in the influence exerted by a variety of factors: for example, technology, tools and diagnostic equipment, environmental legislation, safety regulations, technical and labour standards. The significance of these factors and their influence on the tasks and the challenges at repair shop level are discussed.

4.2.1 The influences of technological change

From the perspective of product technology, the motor vehicle sector at present is characterized by rapid product innovation and a swift increase in the range of products. Motor vehicles are becoming more safe, more economical, more comfortable and more environmentally friendly. New models are qualitatively superior to their predecessors. They have a longer life expectancy and require less maintenance and often have a wide range of accessories and technical equipment to increase driving comfort, to limit pollution and to economize on raw materials. They offer both active and passive safety. These innovations are to be found mainly in four areas:

a. In the field of *engineering/construction technology*: for example, in the development of safer bodywork, new types of engines, multiple valves, chargers, new types of fuel systems and new hydraulic and pneumatic applications, particularly in commercial vehicles, automatic transmissions, four-wheel-drives, safety systems, etc.

b. In the field of *material technology*: for example, the use of synthetic components, ceramics, catalytic converters, piston components, new paints and coatings, zinc-coated motor vehicle bodies, etc.

c. In the field of *(traditional) motor vehicle electronics*: for example, built-in motor vehicle radios, cassette recorders, telecommunication equipment, electrically operated windows, mirrors, locks, etc.

d. Through the introduction of *micro-electronics* and motor vehicle information systems: for example, the use of fuel injection systems, on-board computers, service interval displays, on-board diagnostic equipment, engine management systems, power-steering, ABS systems, etc.

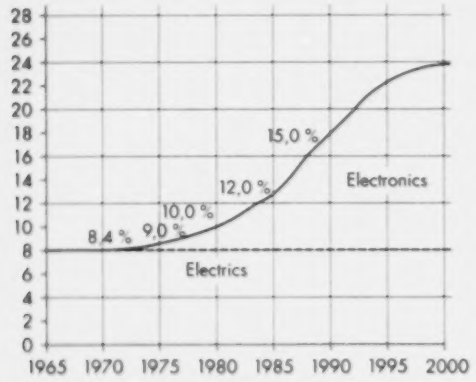
The latter trend, the marked increased in micro-electronic control systems in the motor vehicle has a major influence on work places and skill requirements in the motor vehicle repair trade (NL, Sector Study).

Technological change is happening particularly in electronic systems in motor vehicles. This leads unavoidably to an increase in repair shop equipment.

With the aid of electronics, which is becoming increasingly common in motor vehicles (see Diagram 4.3), computer-controlled and integrated networks to monitor a variety of systems will play an increasingly important role.

In 1990, the number of electronic functions in a new BMW motor vehicle was five times greater than in 1983. The 1976 top model contained four electric motors; today's top model, the BMW 750, integrates 73 of them. A similar increase can be observed in control units, plug connections and switches. Previously, a single wiring diagram was sufficient for the entire motor vehicle. Today 101 diagrams have to be consulted, enough to fill twelve files. Independent electronic systems have ceased to exist. Today all electronic systems are networked (D4).

Diagram 4.3 – Proportional manufacturing costs for electrics and electronics integrated in motor vehicles as a percentage of total cost



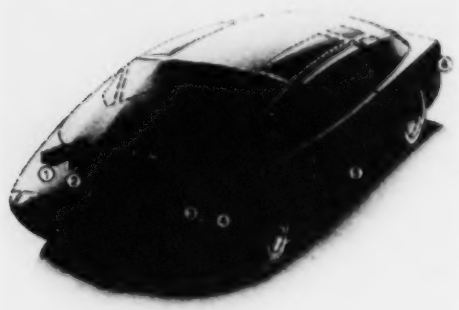
Source: Volkswagenwerk AG

The electronic systems in motor vehicles can be classified in four categories:

- electronics for controlling driving devices;
- entertainment electronics;
- electronic systems for comfort and safety; and
- instruments and displays.

Diagram 4.4 illustrates the structural relationship of certain applications and the trend towards integrated electronic systems.

Diagram 4.4 – An integrated electronic system of motor vehicles



[1] Motronic
[2] Electronic power control
[3] Electronic suspension control
[4] Electronic transmission control
[5] CAN-Bus
[6] ABS/ASR

The driving devices encompass all functions related to engine control such as engine management, electronic ignition systems and electronic gear transmission. Entertainment systems, formerly confined to the radio, now include modern sound systems. Equipment components for safety and comfort are control units with variable power support, active suspension systems and the ABS system. In the long term, an integration of single systems is planned. To improve data exchange between subsystems, Bosch has developed a CAN-system (Controller Area Network). Information is transferred by a BUS according to a fixed standardized protocol.

The introduction of *engine management systems* (monojetronic with integrated ignition and fuel injection; electronically-operated accelerator pedal), *vehicle control* systems (ABD, ASR, electronically-controlled clutches and gearboxes, electronically-controlled suspension, and *vehicle pilot and monitoring systems* (NL, Sector Report) adds to the growing complexity of motor vehicle technology. A high rate of integration of different systems, components and aggregates is necessary to operate the motor vehicle in a safe and reliable way. These are the reasons for an apparently paradoxical situation. The mastering of increasingly complex technology will be achieved by the technology itself.

In this integration process an increasing number of mechanical and electrical components and aggregates are networked and carry out functions needed to control the motor vehicle. This combination is termed "mechatronic". In relation to motor vehicles, it is termed "auto mechatronic".

Employees must have specialist knowledge of mechatronic systems. They must be acquainted with block diagrams, wiring, and they must know and be able to apply signal measurement and signal interpretation. In addition they must know how to use data and documentation on a product in order to carry out tasks. They must be aware of the significance of signals based on *input-processing-output* of "black boxes". What actually happens inside the black box of the system (particularly the mechatronic system) is of little significance to him. All this requires particular capabilities to think abstractly.

The changes in technology are leading to tasks which differ greatly from traditional repair shop work. The employees in repair shops must work with networks which link mechatronic components to mechatronic systems.

4.2.2 The influence of the change in tools, the testing and diagnostic equipment

The development of motor vehicle technology towards mechatronic systems implies the development of related equipment. There is no need to discuss here changes to mechanical tools. Of much more importance are changes in testing and diagnostic equipment for

- comfort and safety systems,
- engine management systems, and
- motor vehicle bodies.

1.

The handling of computer-controlled testing equipment for engine management systems or laser testing equipment for vehicle measurement will soon be routine work in the repair shop.

The development of diagnostic equipment to test motor management systems is influenced by environmental provisions on exhaust fumes in the European Union. The introduction of such tests on the basis of EU regulations require a testing system specially prepared for this type of test (D, Sector Report).

The marked increase in micro-electronics in repair shops, particularly for those tasks which are the main tasks of the trade (problem detection and correction), is of great importance for the work of the motor vehicle mechanic. "The mechanic who is in a position to make a correct diagnosis is the most important factor in the work process. Work with diagnostic equipment requires training. Not everyone can work with diagnostic equipment. One must learn to make balanced assessments and to interpret" (B). Significant developments have taken place in diagnostic and testing equipment and currently all types of testing equipment are being launched onto the market. They offer increasing opportunities and facilities surpassing traditional measurement instruments.

On account of the introduction of these new computer-controlled diagnostic tools, fault detection, one of the most time-consuming tasks in the repair shop, is being simplified. The new diagnostic tools have high storage capacity and can store the most important data, for example, the adjustment data for current models. Diskettes facilitate rapid input of new data. Updated data can be input immediately by diskette or on-line. These tools often not only measure values, but compare these with the standard data produced by the manufacturer and show if a certain value is within a certain tolerant range (approval/error signal). Some testing equipment goes even further than this: should a fault be detected, it also provides information on possible causes for the defect. The mechanic can then investigate faults which appear on the menu. The more expensive engine diagnostic systems also print a diagnostic report when the test programme has run and point to deviations detected. In some cases, a customer report can be drawn up or a repair shop report containing the test results which the customer is in a position to understand. The computerized systems in motor vehicles, the diagnostic systems which are used in the repair shop and above all the opportunity to link both, have led to a great change in the essence of diagnostic work and have substantially reduced the amount of time required for such tasks. The engine test equipment can, for example, be linked to databases of importers or manufacturers so that data from a distance can be updated. This also opens opportunities for diagnosis from a distance, for example, by specialists in the manufacturing firm (NL, Sector Study).

The introduction of new diagnostic systems on account of the development of complex mechatronic systems results in the motor vehicle mechanic in the repair shop having to develop his skills in order to diagnose and eliminate faults rapidly in complex systems, not by repairing units, but by replacing them (IRL). Mastering this complex motor vehicle technology in the area of service and maintenance requires a very high quality of diagnosis and repair technology. This development involves a transfer of mechanics' tasks "from practical mechanics to diagnostics" (NL, Sector Report) or even to motor vehicle mechatronics and diagnostics. The advanced diagnostic systems will reduce time-consuming fault analysis. They will increase rationalization of diagnostic measurement and support *lean service and quality service*. Diagnostic equipment will be gradually introduced throughout the whole sector within the European Union. This is an important challenge to initial and continuing training in EU Member States. A number of case studies (D, B, NL, DK, IRL, GR, E, F, UK) are already contemplating diagnostic systems which would be operated by experts and networked to manufacturers' databases. The structure of these systems will have a marked influence on the development of skills in the repair shop. This type of expert system comprises a dialogue structure with a self-learning character and offers the opportunity to use systems as information and training systems. These systems, however, will not determine skill requirements. A high degree of skills on the part of the user would, however, facilitate the tool character of these diagnostic instruments. However, the opposite could take place if manpower is not sufficiently skilled.

A level of skills which is too low can lead to the introduction of deterministic diagnostic systems and reduce requirements to the level of their mere application. This trend could lead to the creation of a small group of diagnosis and repair experts in the repair shop in charge of only difficult repair work (for example, NL Sector Report).

The issue of skills should be seen from the following perspective:

There are no major differences in the basic functions of diagnostic equipment. The use of such equipment varies, however, substantially. This requires a great amount of knowledge on the part of the operator, but this knowledge applies only to a certain brand name. Thus, operators in repair shops must acquire operating knowledge which is not labour-process-specific and which is redundant when a company or motor vehicle make is changed. By improving user interfaces, these "fake qualifications" may be reduced. Improvements may come through self-

learning or tutorial systems which enable learning during the work process.

This will be to the benefit of both manpower and manufacturer. For the workforce, their operating knowledge will not be lost when they change company or make or the motor vehicle they repair and for the manufacturer it would mean that the skills and knowledge acquired in another make of motor vehicle could be applied, thus reducing the need for learning a system or training. This would create greater scope for learning and training opportunities in the skills which are work-process specific.

4.2.3 The influence of environmental legislation

In the EU Member States there are numerous provisions and standards for adherence to certain technical standards. New environmental legislation and regulations present a major challenge to the motor vehicle industry.

The ECR (European Community Regulations) or the European standard ECN limiting emissions from 1993 onwards, is binding for all EU Member States. There is a certain amount of discussion on tightening policy and regulations on the organization of business premises (Nuisance Act in NL or the Environmental License in B), processing materials and waste (oils, paints, batteries etc.) – The Avoidance, Reduction and Recycling of Waste from the Motor Vehicle Industry in Germany, and application of new safety legislation for motor vehicles.

Both motor vehicle manufacturers and repair shops will have to meet higher standards and entrepreneurs and company employees will be required to have specific qualifications in this area. For employers in the motor vehicle recycling sector, the environmental legislation envisaged within the EU Member States will pose a challenge for the establishment of a recycling industry.

The envisaged recycling regulations with very high recycling rates will accelerate developments towards new motor vehicle technology, more specifically in fuel distribution and engine adjustment systems.

Many of the companies' studies endeavour to fulfil the new environmental regulations for motor vehicles as well as regulations on the disposal of waste and repair shop equipment. Belgium reported new regulations on the use of spraying cabins, Luxembourg reported new regulations pertaining to combustion devices using liquid or gaseous fuels, on water pollution, toxic gas emission of paint shops. Greece reports new emission regulations combined with high taxes. Repair shop staff must be acquainted with these new challenges and training must support such progress.

All sector studies report that environmental legislation is influencing the motor vehicle sales and repair industry. Spain reports that an estimated 88.7% of repair shops have purchased new equipment (machines, measuring devices, diagnostic systems (over the past 2 years) (E, Sector Survey). Other countries, for example, B, DK, NL, D, IRL, UK, also report high investment in new equipment. On account of new exhaust control regulations, this process will accelerate in all EU Member States. With the exception of some countries – GR, P – the standard of available equipment in repair shops is comparatively high. It varies, however, depending on the kind of dealership.

Adherence to such regulations requires knowledge of and ability to carry out diagnosis with suitable equipment. Analysis of motor vehicle exhaust emission with respect to new legislation becomes a more complex task. This is, however, indispensable today for *quality service*.

The environmental legislation and growing public awareness of environmental issues has already led competing manufacturers to incorporate this in their marketing and production strategies.

4.2.4 Influence of provisions on repair shops and safety

In EU Member States, there are a number of safety provisions and quality provisions for repair shops. These provisions are so numerous that they cannot all be listed here.

However, some of the more significant provisions should be mentioned, in particular the UK norm *BS 5750* which is a quality standard for manufacturers. This norm is making increasing in-roads into the sales and service sector. In addition, mention should be made of *Law No. 122* in Italy, which requires supervision of repair shops in the sector and quality standards, and finally, Spain's *Law No. 1457/86*, which endeavours to raise quality by incorporating technical modernization and company management.

One of the effects of these standards is to reduce the number of small-sized companies as they are not able to adhere to such regulations. The positive effect of the regulations is a quality improvement of repair shops ensuring a certain level of quality service and safety for workplaces and motor vehicle fleets in the EU Member States.

In some cases in the UK, the standard BS 5750 is described. BS 5750 could serve as a good example for other EU Member States in order to introduce quality standards for operating a repair and sales facility.

It would help to improve the quality of service and the quality of equipment used. Higher qualified staff would also be required, and this would

encourage efforts to set up efficient continuing vocational training systems.

4.2.5 The influence of standardization and module concepts

A number of technical standards do exist in the motor vehicle sector. They correspond to the product, i.e. the technology of motor vehicles themselves. There are also standards for tools and repair shop equipment.

Apart from general standards for various components, there are a host of manufacturer-specific standards leading to make-oriented configurations of motor vehicles which do not allow for an exchange of components with the products of other manufacturers. This results in a generally high *make-orientation of the product*, but also for tools, testing equipment, diagnostic devices, data and workforce. Manufacturer-specific standards encourage such a development. Continuing vocational training measures must therefore be adequately producer-oriented. The functioning principles of these components or systems remain the same. A monojetronic, for example, is a monojetronic regardless of which make it is part of.

On the other hand such a development promotes the idea of lean service on account of the fact that trends towards a repair free motor vehicle must only consider a very limited range of makes which facilitates innovation. However, producer-specific standardization is a considerable *obstacle to mobility* for the workforce and a factor entailing high expenditure on training by the manufacturer. Daily tasks, the entire range of continuing vocational training, total dealership structure is oriented to products of one particular manufacturer and this represents a unique *workplace culture* which inevitably results in a high degree of identification with the company.

This aspect is also accentuated by substantial differences in the use of tools and diagnostic equipment by various makers. Repair shops of all sizes and categories must face this fact.

This situation results in a high-degree of attachment to the workplace and the company. This is confirmed by case studies in Germany, Belgium, Italy, Ireland, Spain and Luxembourg. On the other hand such a situation reduces opportunities to transfer qualifications acquired to other products without problems and without further training. This is an obstacle to mobility which will have an unfavourable effect on the envisaged merger of the individual markets of EU Member States towards a single market.

A reduction of make-specific operational knowledge which results in "fake qualifications" is desirable. Methodological know-how, functional knowledge and instrumental abilities and skills should be promoted for a variety of reasons:

- they are necessary for the work process in the repair shop;
- they can be easily transferred to other products.

This would have a favourable influence on the European labour market.

The consistent application of producer-specific standards to its particular products implies production of the *"modular" motor vehicle*, with regard to technology. Current requirements to fulfil a great variety of customer requirements demand greater differentiation of services and products. "The reaction to these different customer requirements is now expressed in the development of all sorts of product variations and in the range of accessories, but it is to be expected that in the near future the motor vehicle industry will adopt introduction of the concept of a *modular motor vehicle*. This concept means that the customer chooses from a limited number of more or less basic body models, plus a range of modules which allow for the composition of a complete motor vehicle with the help of the motor vehicle dealer" (NL, Sector Report). Such a development is likely to influence tasks in the motor vehicle repair shop considerably. This modularization will facilitate service and maintenance tasks dramatically.

The response to this forthcoming trend should establish a skills profile which can be transferred to a variety of work processes: these are, primarily, methodological knowledge (for example, how diagnoses are carried out), functional knowledge (for example, the operation of systems such as monojetronic or ABS) and instrumental capabilities and skills (for example, use of computer systems).

It is likely that these measures will have a favourable influence on the European labour market in regard to the *transferability* of qualifications and will thus create greater mobility of workers. The training required for make-specific, product-oriented courses (loss of working time, costs) could be reduced while opportunities for workplace-related continuing training could be increased: for example, courses in fault detection, methods of solving problems, continuing training to develop social skills. This strategy would guarantee the survival of smaller companies (size !) through reducing the degree of specialization in certain motor vehicle makes.

4.3 Changes in tasks in the motor vehicle repair shop offers scope for action

The above-mentioned factors and their influence on the changing tasks in motor vehicle repair shops require measures to ensure quality service in order to remain competitive.

The following chapter discusses means by which the motor vehicle repair and sales sector can meet

these challenges through quality service and quality competition. The discussion will examine the areas of work organization, company management and administration.

4.3.1 The shaping of work organization

Internal organization of the work process in repair work

The form of work organization in the repair shop is in itself an additional important factor relating to the tasks and challenges facing a skilled worker. The case studies have identified two standard models. One could be called the "Conventional Concept", which is practised in the majority of companies, and the other could be termed the "Team Concept".

Shaping work organization in companies is primarily a management decision. This restructuring aims to increase *productivity and customer satisfaction*. There are no limitations as far as developing product technology, the equipment, the testing and diagnostic equipment or standardization are concerned. The size of the company influences the scope of action of the various forms of work organization.

"Conventional Concepts"

1. The predominant model of work organization is characterized more or less by proscribed *horizontal division of tasks and work*. The scope of the tasks allotted to each employee or group of employees depends on the main systems in a motor vehicle. The following are fairly stable, demarcated areas of activity:

- bodywork and spraying
- motor vehicle electronics.

While the area of mechanical components and aggregates is still fairly transparent, the above-mentioned fields of activity have clearly demarcated special tasks. Motor vehicle electronics requires intensive continuing training. A master craftsman's diploma or an informal qualification as a highly skilled technician is often required in this area. The division of tasks within the company often corresponds to the course structure and offer of customer service schools. As a general rule, specialists take the special courses offered by customer service schools.

In this concept mechanical tasks and inspection/maintenance are often subdivided in addition to the fields of bodywork and motor vehicle electronics. In larger companies (size II and higher) tasks are subdivided into additional sections or departments (NL, Sector Report). Sometimes mechanical tasks are further subdivided into brake systems, gear boxes, engines, clutches, etc. In this case the mechanics are highly specialized in a certain number of tasks but this leads to a decrease in occupational qualifications.

This also leads to a reduction in flexibility of an employee and in the complete separation of the customer service department from the repair shop which in turn leads to a decrease in communication between customer and repair shop staff. Developments of this factor which was discussed in Chapter 4.2, for example, technology, diagnostic equipment, tools, modules, etc., seem to point in the direction of an integrated component system, systems and functions, which must be maintained with the help of the required equipment. The division of tasks and work should not portray a future strategy resulting in a reduction of quality service and customer service.

2. The opposing principle of work organization is the concentration of a host of tasks in the hands of one single mechanic. This concept is similar to what is termed the *all-round model* which expects of every employee that he carry out all types of service and repair work. Usually in this model one single mechanic repairs one motor vehicle. Each mechanic has his "own" tools with the exception of diagnostic equipment and tools for changing tyres, or other large pieces of equipment.

Such work organization requires highly-qualified, multi-skilled and flexible employees and is more suited to smaller companies (size II and II). This concept helps to improve occupational qualifications.

In this case, the mechanic must be qualified as an all-round mechanic, enabling him to work at any workplace in the repair shop. Many case studies mention this conventional concept. Mixed organizational principles – i.e. a combination of I and II – are prevalent in many repair shops.

The all-round model corresponds to the increasing integration of systems. The customer communicates directly with the mechanic. This promotes good customer relations. Usually the departmental structure is not as developed as in model I.

"Team Concept"

Only two case studies (D, DK), and the French conclusions report on the "Team Concept". Denmark describes the Team Concept using the examples of the Volvo and Renault makes and shows that this has developed differently in specific repair shops. Denmark mentions that this type of concept is in line with the corporate philosophy of the Volkswagen group. On account of the wealth of experience with this concept within the VW organization (in some 25% of all repair shops the VW dealer network approach is applied), this merits closer description. The Volvo/Renault concept is similar to the VW concept with regard to internal organization and proved that

this concept can be applied to repair shops of any make of motor vehicle.

The growth in the motor vehicle repair sector in the VAG service area in built-up areas has led to an extension of motor vehicle repair shops. As a consequence, the assignment of tasks by the repair shop master craftsman as practised in small companies, reached capacity limits. Centralized task assignment with a clearing position seemed to be the best solution and the most adequate response to this. A crucial disadvantage proved to be the separation of order acceptance and the repair shop. The lack of contact between customer and repair shop staff proved to be the Achilles' heel of the repair shops. To solve this important marketing problem the Team Concept was developed. This concept aims to reconsolidate the distributed repair shop organization – VAG called this ironically "repair factory": in smaller units or teams. Each team is an independent working group and assumes responsibility for a certain number of repair orders beginning with repair acceptance to delivery of the motor vehicle to its owner. VAG envisages that these teams can be introduced in companies of a certain size. The minimum seems to be 20 employees in a repair shop. Each team is comprised of:

- a customer service master craftsman
- a mechanic-in-chief
- three to four motor vehicle mechanics
- two to three apprentices.

The customer service master craftsman is the team superior with regard to specialization and discipline. He is responsible for accepting the order, for its disposition, for expertise and management of the team, for final control and handing over of the motor vehicle to the customer. The mechanic-in-chief is his deputy. On a daily basis, such a team can complete 15–17 repair orders.

The degree of specialization of team members is low. The team members follow principles which are used in smaller repair shops, i.e. the so-called all-round model. Such a model requires highly qualified mechanics with a broad field of activity. The teams must have plenty of scope for manoeuvre. They require a PC and all the necessary information. Teams should be in the position to use diagnostic equipment and other computer-assisted tools. The Team Concept is not only a customer-oriented principle of work organization, but also helps to prevent any degree of polarization in qualifications in the repair shop.

As has been known for a long time from other areas of organizational development, a change in work organization or introduction of new organizational concepts is a task which can only be carried out with staff which has been specially trained for this and through involving all partners in the process at the correct point in time.

This type of work organization, which offers group scope for manoeuvre with a high degree of responsibility, must include direct contact with the customer and thus contribute to better communication and thus to a better quality in repair work.

Concepts must be developed to introduce and extend this type of work organization in a number of repair shops in the sector. An assessment must be made of which type of formal organization of the repair shop promotes the Team Concept best of all, how employees should be prepared for this and how communication between manufacturer, customer service schools and repair shops can be organized in this context.

Formal organization of work in the repair shops

Work organization in the repair shops varies little from company to company, depending on their size, the skills available and the corporate philosophy. The final chapter in the Danish report describes a standard for the organization of the work process. The following steps should be cited as an example.

1. Order acceptance: The foreman, the owner or another senior employee accepts the order, diagnoses the problem, fixes the time schedule and, at times, the price and completes the order form.

2. Delegation of the order: Depending on the particular skills of the mechanic and his work load, the foreman or another senior employee assigns the order.

3. Execution of the order: For special tasks, for example, electronic components, mechanics in a department are often classified according to their specialist fields. Usually, however, the mechanics are all-round mechanics who can handle all tasks. The division of work may be either "one man – one job" or smaller teams doing all jobs on one motor vehicle; this is often the case when time is short.

There seems to be an understanding that not too high a degree of specialization helps maintain the breadth of the mechanic's skills and increases flexibility in the repair shops. (DK, Concluding Chapter).

Depending on the size of the company, there are variations between steps 2 and 3. In smaller companies, there is no differentiation between step 1 and step 2. In medium and larger companies (starting with size II), motor vehicles move from section to section if required and if the company practices a tight differentiation of tasks (E and B).

This type of formal organization is oriented towards the horizontal division of tasks – "Conventional Concepts – model I". With respect to the Team Concept and/or the all-round model (Conventional Concept II) being more customer-oriented, guaranteeing a higher quality of work and higher motivation of the workforce, the formal organization of work described must be adapted to these more successful models. Some changes in the described steps would be necessary in this process.

4.3.2 The shaping of the distribution system

A number of case studies (DK, IRL, B, F, NL, D, I, L, E, UK) clearly stress that the quality of service is becoming an increasingly important competitive factor for the motor vehicle dealer both in sales and in motor vehicle repair.

The gradual saturation of the market in most EU Member States and the decreasing world-wide sales figures have produced strong competition between manufacturers represented by their agencies. The competition is influenced by a number of factors, for example, quality and technological standard of the product, price, product range, advertising, type of sales and customer service. All case studies which focused on major motor vehicle makes (Mercedes, VW, Renault, Fiat, Seat, Toyota, Mazda, Nissan, Volvo, etc.) stress that good customer service is extremely important. An important aspect of competition is a degree of direct communication between customers and repair shop staff.

The philosophies of maintaining and winning customers vary but pursue the same aims. The following strategies can be cited by way of example:

Nissan: putting greater emphasis onto customer service is the key to success (Concept TC3 and Eurostep) (IRL),

Toyota: "customer satisfaction – a training programme" – special further training for sales personnel and foremen (DK),

Suzuki: "being customer-oriented" (E, Suzuki),

Mazda: "in principle, competition is good for business" (D),

Volvo: creating a friendly atmosphere (DK); a clean and open repair shop creates trust (B),

Mercedes: all-round service is part of the corporate strategy to create long-term business relations with customers (D),

Fiat: "after-sales" marketing has proven that it keeps customers (I),

VW/Audi: ... that if the customers are looked after properly, they will continue to buy the (VAG) range of vehicles (IRL); good service is vital for binding customers to the dealer (D),

Seat: aim: to improve quality and customer service (E),

Renault: their main strategy ... to aim for excellent customer service (E),

SAAB: the customer is the focal point of activities and reflection within the company. Each employee is in direct contact with the customer in order to facilitate the most rapid and reliable service possible (L),

Ford: a system of standards to guarantee customer satisfaction was developed (IRL).

All these strategies aim to win and bind customers to the dealer and thus to the specific sector.

The strategies of Japanese manufacturers (Nissan, Toyota, Suzuki) state clearly and directly that the customer is the target group. All other makes mention the customer indirectly and stress the importance of service for the customer. The customer is given particular attention in all companies. Some of them have even created special departments to this end (GR).

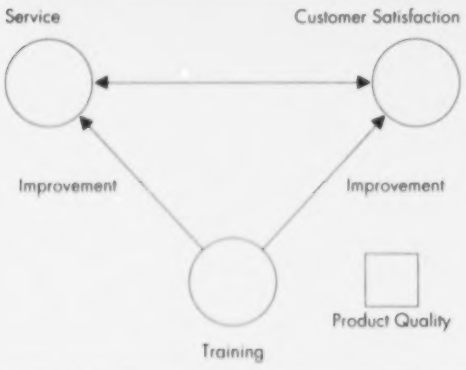
The case studies stress (DK, L, IRL) that the service quality of dealers in all fields of activities will become increasingly important. International trends have intensified the application of complex motor vehicle technology and modern equipment. Such factors prompt a need for intensive continuing vocational training in company management, sales/marketing, customer relations and technology in order to prepare employees for changes in tasks.

From this it can be concluded that in addition to product quality, customer satisfaction must be one of the main current aims and that this can be attained through providing excellent customer service throughout the company. The most comprehensive strategy is described in a sector study of the United Kingdom: "more and more UK companies are seeking to establish total quality systems based on the active involvement of all employees drawing on a general workplace culture" (UK).

Diagram 4.5 shows the interrelationships between service, customer satisfaction, continuing training in the form of a triangle.

The continuing training of employees is viewed as the most important measure for improving the

Diagram 4.5 – The interrelationships between service, customer satisfaction and training



quality of service and customer relations in almost all case studies.
An advanced knowledge of modern motor vehicle technology is becoming increasingly important for sales personnel (IRL) who must be able to transfer this knowledge into sales arguments. "The task of a good salesman is to translate the specific technological aspects of a motor vehicle into commercial, functional and economic arguments on the basis of which a hesitant customer will ultimately decide to purchase the new motor vehicle he wants." (NL, Sector Report). In addition, sales staff must be capable of binding existing customers to the company and of helping customers to resolve financial issues relating to the purchase of a new motor vehicle, and must be able to transpose customer wishes into technical solutions. The sales process will become increasingly professional, especially when customers are guaranteed that their specific wishes are being taken care of. Sales personnel must be prepared for these challenges. (In other words, this cannot be attained only through intensive continuing training. A *general workplace culture* (for example, the United Kingdom) must be developed jointly with the staff.)

4.3.3 The organization of administration

Another area which can be restructured is administration and computerization of administration and stock. This encompasses stores, sales and management functions. In recent years, many companies, independent of their size, have computerized administration and logistics (B, GR, NL, D, E). Independent repair shops are less computerized.

At present, computerization of companies is following three different directions:

a. Decentralized dealer computerization aiming to provide support for administration (accounting, company finances, storage of data, warranty provisions) and the movement of parts in the store. These computer systems can be networked to the manufacturer.

b. Centralized computer networks which are networked to the manufacturer on a European scale. These networks were and are being set up by major manufacturers (BMW, Mercedes, Opel, Peugeot, Renault, Fiat). This type of system facilitates administration in general, particularly stores and the repair shop area. The aim is to provide information and data which the dealer needs in order to call up the data on sales statistics, spare part needs, the types of repair shop orders and particularly for trouble-shooting.

c. Independent repair shops and very small repair shops make little use of computers or computer networks.

In future, the companies will communicate via the network with the manufacturers. All departments of a company will be connected to the network.

A hotline will be set up between the repair shop and the manufacturer to help in solving technical problems or to consult a database, for example, in formulating reports on damage. A Belgian case study (B) reports on the AUDATEX data bank. With the help of a variety of communication tools, the manufacturer transfers all the necessary information to the repair shop. Similarly, the repair shop provides information for the manufacturer on particular defects, quality problems, the number of orders and other important data.

Stocks will in future also be monitored using computers. The manufacturer receives information on spare parts movements and orders for spare parts. The stores staff must be able to work with computer systems. The level of qualifications required for this work depends on the software used.

A host of administrative tasks can also be carried out with the help of electronic data processing systems, for example, company finance, accounting, warranty guarantees, storage of customer data, sales figures. The staff must be trained in using the appropriate software and in communicating with the manufacturer and the customers by making use of data stored in the computer. As mentioned earlier, the qualifications required depend on the software used.

The computerization of companies networked to the manufacturer and supported by them is increasing rapidly. Staff are only partly qualified for these tasks, i.e. either by the manufacturer or by other bodies providing continuing vocational training (for example, BOVAG and INNOVAM in NL; SEA, the Flemish Employment and Continuing Training Service; FOREM, VIZO, CEVORA in B; AMU in DK; ANFA and other institutes in F;

Chamber of Trades in L; INEMA in E; CECOA and CEPRA in P; SIMI and FAS in IRL; private bodies in GR, I and D; Chambers of Trade in D).

Independent companies only have the opportunity to participate in courses organized by spare part suppliers or software training centres or in courses which are offered by the institutes listed above in the various countries which are independent of the manufacturers.

Computerization will rationalize administrative tasks, but will also cause a reduction in personal and direct contact. This provides all the more reason for developing a workplace culture preventing isolation of employees as their active involvement is fundamental to attaining quality service.

4.4 Changing tasks leads to new challenges and continuing training strategies

The results discussed in sections 4.2 and 4.3 are an example of the need to reflect on how areas of activity can be organized to successfully repair and sell motor vehicles. The needs differ markedly and there are numerous different possibilities. The various perspectives should be examined from the point of view of "Job Design".

The changes in job design depend mainly on:

- increasing integration and networking of motor vehicle technology into systems technology;
- the use of complex diagnostic technology and expert systems;
- extending the spectrum of tasks in the repair shop to do justice to environment legislation and safety regulations;
- the increase in production of motor vehicles using the module system;
- the increased use of electronics in administration, repair shop and stores; and
- the increasing intensification of customer service.

These trends have a marked influence on processes for restructuring repair shops.[9] The challenges have become greater. Given the complexity of systems in the motor vehicle, the networking of the administration and more and better informed customers, it is becoming increasingly difficult to differentiate between areas of activity. Employees in the repair shop must fulfil a number of functions simultaneously if forms of work organization are selected which are close to the customer. The flexibility of staff must increase accordingly to keep pace with the rapid changes in tasks (E, Conclusions).

The variety of tasks in repair shops in those EU Member States with an established motor vehicle market is receding. The German and UK Sector Reports and partly the Netherlands Sector Report confirm that in spite of increasing electronics in motor vehicles, the share of repair specialists is clearly declining. In the UK, the share of electrical repair specialists declined by 28% in recent years, in Germany by about 10%. These figures and the facts contained in Sections 4.1 and 4.2 are proof of the changes in job designs in the repair shop. Trends point to an increase in tasks and functions while at the same time employees are becoming increasingly specialized (E, Conclusions; UK Sector Study; I, Conclusions). This seems to be the only feasible means of attaining quality service and intensive customer relations linked to rationalization in the sense of lean service, and of increasing flexibility at the workplace.

This creates a new definition of fields of activity. In repair shops the high degree of specialization of the past has no chance of survival (see case studies on IRL, D, DK, UK); the fields of activity have been divided up and flexibility between these fields increased for each employee. All-round tasks in smaller repair shops or work organization according to the Team Concept meet these needs.

The expectations of and challenges to continuing vocational training increase on account of these new and extended job profiles. The continuing training systems react in a variety of ways. Essentially, the case studies and sector studies point to three directions:

- Specialization model

This model which is common in Greece, has its origins in a highly differentiated license to pursue

[9] The traditional mechanically oriented "multiskilled" mechanics must be retrained in a relatively short period of time. They must acquire knowledge of integrated electronics, modern testing and diagnostic equipment, new information systems and new types of motor vehicle body. New repair methods and strategies for solving problems must also be acquired.
With regard to motor vehicle bodywork, new skills are needed, particularly for general work with new materials and with regard to recycling and the use of new, efficient methods and tools.
Work processes and system-oriented knowledge is more important than technology-oriented knowledge as components and aggregates in the motor vehicle are no longer repaired but replaced. This means that knowledge of the whole system is more important than detailed knowledge.

an occupation as stipulated by Law 1575 (GR, Sector Report). This law divides the occupations in the motor vehicle sector into fourteen technically-oriented specializations, producing an enormous spectrum of tasks in highly specialized repair shops. Qualifications and continuing training measures aim to increase specialization.

This development contradicts the findings of previous chapters which had led to the conclusion that the motor vehicle mechatronic is most suitably adapted to current and future needs. Models with greater and customer-friendly work organization are also increasing in importance. These, however, cannot be implemented where there is a high degree of specialization because this implies a large number of specialized repair shops as for example, is the actual case in Greece. In such a structure, the customer is not given all-round service in one single repair shop.

- Multiplier and cascade model

This continuing training model is a response of a number of manufacturers/imports (IRL, D, E, I) to increasing needs on account of technical development, customer demands, environmental legislation and other legislative provisions. It confirms the changed profiles, and envisages that employees should undertake more comprehensive and complex functions while trying to apply a decentralized concept to satisfy the needs for continuing training resulting from this.

Management, administrators and technicians are prepared for the various tasks by the manufacturer. In the case of technicians, it is an instructor (multiplier) who is trained by the manufacturer. He in turn trains his colleagues in the repair shop (cascade). The cascade is supplemented by multimedia correspondence courses which each employee can follow in his own time. The aim of this model is to give a speedy reaction to the changing tasks with the aim to train all staff involved at a reasonable cost in terms of money and human resources and thus to swiftly adopt the new occupational profiles.

- Comprehensive model

This model is based on the findings relating to the need to broaden occupational profiles and to increase employees' flexibility within areas of activity (UK, Sector Study). This large scale occupational profile plays an important role particularly in smaller repair shops (category I) and repair shops applying the Team Concept. All-round employment of employees means that they must cope with a large variety of tasks. The multi-skilled worker, who can flexibly fulfil a variety of tasks is required. The continuing training system in such instances can only react by offering a broadly-based programme (a broad base of skills, extending beyond the limits of traditional skills).

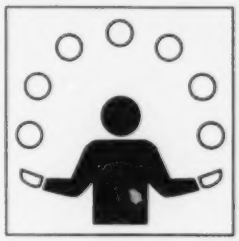
This requirement is extended by concepts such as EUROSTEP (European Technical-Education Programme), a training concept practised by Nissan (IRL) which "ensures that everyone within the organization at a technical level in Europe is trained in a modular form from the same standards" (IRL). This programme leads to four levels of education (from technician to master technician). The aim is to develop *European mobility* of repair shop staff.

An important characteristic of the comprehensive model is overall training of all staff by the manufacturer. Only those repair shops linked to a certain make can profit from such measures. New work organization tools can most likely be implemented in these companies.

All firms in the sector throughout Europe are equally effected by these changes, particularly by the extension of occupational profiles. The companies linked to manufacturers receive support to implement these changes in the form of continuing training schemes provided by the manufacturer/importer. This encompasses some 50% of all companies and 70% of all employees. This model of comprehensive continuing vocational training is best suited to broadening the occupational profile.

For employees in independent companies, there are no supportive measures from the manufacturer. They must depend upon the chambers of trade, the trade unions and state bodies which to date have produced little in the way of supportive measures.

PART 2:
TRAINING



5. **VOCATIONAL TRAINING OR WHAT DOES CONTINUING VOCATIONAL TRAINING BUILD UPON?**

5.1 **Compulsory schooling**

5.2 **Structure and contents of initial vocational training**

5.3 **The ratio of employees to initial vocational training**

5.4 **Summary**

6. **CONTINUING VOCATIONAL TRAINING OF THE WORKFORCE**

6.1 **The provision of continuing vocational training and its importance**

6.2 **The training policy of providers of continuing vocational training**

6.3 **Contents of courses offered by providers**

6.4 **The training concepts of those providing continuing training**

6.5 **Training concepts at repair shop level**

6.6 **The need for individual continuing vocational training**

6.7 **Transfer of continuing vocational training in the repair shops**

6.8 **Continuing training target groups**

6.9 **Teaching strategies of the providers of continuing vocational training**

6.10 **Trainers**

6.11 **Costs of continuing vocational training**

6.12 **Evaluation of costs**

5. VOCATIONAL TRAINING OR WHAT DOES CONTINUING VOCATIONAL TRAINING BUILD UPON?

In this chapter we would like to present differences and similarities with regard to vocational training systems in the motor vehicle repair sector in the different EU Member States – differences and similarities with regard to the structure and the content of vocational training.

The main contents to be discussed are as follows:

- There will be a description of what continuing vocational training builds upon. In other words, on what level of initial vocational training does continuing vocational training build.
- This description should make it possible to analyze and evaluate whether and how various providers of continuing vocational training reflect differences and similarities in the occupational "entry level" (Chapter 6) of employees in the sales and repair sector.

We do not want to contribute to current discussion on the strengths and weaknesses of the dual system compared to the school or mixed system. It is not our concern to analyze and explain differences in vocational training systems on the basis of differences in religion, history, philosophy, economic structure or administration. The discussion will limit itself to the various points of departure for continuing vocational training based on an assessment of the national sector studies.

A few short examples should illustrate the importance of this point.

In Greece, continuing vocational training initiatives face a workforce where a large proportion of the employees, especially the elderly ones, have not undergone any initial vocational training on account of the fact that formal initial vocational training did not exist prior to 1985 and another group of employees have a rather outdated poor theoretical vocational background (GR, Sector Report).

The sector study comes to the conclusion that it is "imperative" to train this manpower after recruitment.

In the UK, continuing vocational training cannot be clearly separated from initial vocational training as apprenticeship training is becoming less important and responsibility for continuing training is shifting more or less into the hands of the employer. Here continuing training measures serve to bring employees up to the nationally recognized NVQ level which is attained in other countries during initial vocational training.

In countries such as Germany, Denmark, Luxembourg, the Netherlands and Ireland, the continuing vocational training in the sector is confronted with employees who have to a large extent taken part in initial training in the form of alternance training between company and school.

5.1 Compulsory schooling

Today initial vocational training follows on immediately after nine or ten years of compulsory schooling. In the United Kingdom, compulsory schooling lasts eleven years. This quite homogeneous pattern is relatively new in Portugal, for example. Until the fall of the dictatorship, school was compulsory for only five years in Portugal. Thus, many employees in the Portuguese motor vehicle repair sector have a low educational level. Today Portugal is adapting to the pattern of other EU Member States.

In Belgium, compulsory schooling was extended in the last decade. In 1983 the minimum school leaving age was extended to 16 (prior to that it was 14) and subsequently to 18 to include secondary school which can be a vocational school.

5.2 Structure and contents of initial vocational training

The twelve sector studies show a great diversity in initial vocational training systems in the motor vehicle sector. The stereotypes of school training, alternance training between school and company and mixed systems scarcely cover the variety.

The majority of countries apply simultaneously various structural systems and there have been and continue to be many attempts to cater for the needs of changing qualifications in the sector.

Contents/occupations

Which professions does initial vocational training produce? Is there a tendency to generalize in those cases where relatively few occupations should meet the needs of the repair sector? Or is there a tendency towards specialization in small more specialized occupations?

It is not the aim of this study to carry out a detailed analysis of initial vocational training. The reflections contained here aim to provide a brief overview. The various descriptions of occupational profiles in the initial vocational training systems of a number of Member States are listed. This adds transparency to an enormous variety:

In Belgium there are a relatively large number of different occupations in the motor vehicle sector:

- Flanders:

Focal points

a. Part-time training: motor vehicle technology
bodywork/panel beating

	administration
	bodywork
Apprenticeship:	motor vehicle radiator construction and repair
b. School-based:	motor vehicle technology
	bodywork/panel beating
	truck driver
	carburettor
	light combustion engines
c. Specializations:	special bodywork techniques
	special spray techniques
	motor vehicle electrics
	commercial vehicles
	diesel/LPG engines
	engine maintenance

The Walloon schemes show a similar variety.

Other countries with different occupational groups and a larger number of occupations are Greece and Luxembourg and to a less extent France.

As the Flanders example already shows, the variety within the vocational training concept of the various countries is not synonymous with the variety of occupational groups. In Greece, for example, apprenticeship training, prepares for few occupations and school training is not considered here:

- motor vehicle electrics
- motor vehicle mechanics
- motor vehicle bodywork mechanics
- internal combustion engineer technician.

In countries such as Germany and Denmark the number of occupations catered for in initial vocational training has been reduced with the result that today there are only one or two organizational models through which one can qualify.

In Denmark, for example, there is only one path via a system which trains through alternance between company and school for the following occupations:

- motor vehicle mechanic and electrician
- commercial vehicle mechanic
- motor vehicle bodywork mechanic
- motor vehicle paint mechanic
- wholesale assistant.

Motor vehicle electricians and mechanics which are two different occupations in certain countries, are occupations which are integrated in this model. This is true of IRL, P, L, and NL. In Germany, the motor vehicle electrician is still a specialization but the numbers in this occupational group have decreased markedly.

No country has adopted a school model alone for vocational training.

In the UK, initial vocational training within a company without formal recognition seems to be the rule. Twenty years ago a substantial number of apprenticeships were trained this way. The NVQ system which has recently been introduced will, in all likelihood, imply a further change in the dominance of the company. The UK Sector Study states that implementation of this system is still in the development stages.

In France apprenticeship training was introduced at the end of the 1980s and it seems to be successful. In Ireland, the Minister of Labour announced in 1991 the introduction of a newly-structured apprenticeship training system.

Spain has also introduced a new form of initial vocational training in 1990 which aims to develop basic knowledge and basic qualifications for future occupations.

5.3 The ratio of employees to initial vocational training

With regard to the number of skilled workers and semi-skilled workers in repair shops, there are major differences throughout the EU Member States. This to a large extent is a result of historical developments in the apprenticeship system in the various countries. In countries such as Germany, Denmark and Luxembourg – countries which have a long tradition of alternance training between school and company – almost all employees at repair shop level have an apprenticeship certificate. In Member States such as Portugal and Greece, which have little experience with initial vocational training, the number of formally-qualified workers is relatively low (some 50%).

5.4 Summary

1. In many countries, provisions on compulsory schooling and initial vocational training are in a state of flux with regard to duration, content and to the question "if initial vocational training should take place only in the schools, or should alternate between school and company or should be in a mixed form". As a result, employees in the motor vehicle sector are fairly heterogenous. Continuing training measures are confronted with an enormous variety of qualification phenomena among employees:

- the unskilled 50 year-old worker in Portugal with 5 years of compulsory school;
- the 20 year-old motor vehicle body mechanic from the small business apprenticeship scheme in Flanders;

- the motor vehicle electronics mechanic from the alternating system in Denmark.

2. The European landscape of officially-recognized occupations organized in initial vocational training is very broad. The motor vehicle sector is no exception. Various organizational models, often with different occupational titles within the same country, make it rather difficult to paint a European picture.

6. CONTINUING VOCATIONAL TRAINING OF THE WORKFORCE

2.

6.1 The provision of continuing vocational training and its importance

Four groups are active in providing continuing vocational training in the motor vehicle sector in the countries of the European Union. They may be divided up as follows:

A. *Manufacturer-oriented providers:* Customer service schools of the manufacturer, training centres of importers and their organizations, subcontractors of manufacturers or importers and the customer service schools of component manufacturers.

B. *Employers' organizations, Chambers of Trade/Guilds, Trade Unions* – (social partners).

C. *Public providers:* public continuing training centres which are run by the state or by public bodies.

D. *Private providers.*

Diagram 6.1 gives an overview of the most important providers of continuing training in the motor vehicle sector of EU Member States divided up into the four groups described above.

All providers are oriented towards intensifying continuing training of the workforce employed. There are a number of initiatives in the sector responding to latest trends in technology, to the new challenges in the commercial sector and to the need for quality customer service (see sections 4.1 and 4.3). The tasks, concepts and strategies of providers vary and are influenced by specific national situations in the sector.

There are signs of a regulation of continuing training in EU Member States. This applies only to certain parts of continuing training, for example, the master craftsman training (D), improving the interrelationship and cooperation between initial vocational training and in-company continuing training or special continuing training to integrate women (B) or less qualified manpower. A policy of self-regulation in place of a comprehensive state provision (UK, Sector Study) is being applied as is a policy of overall coordination of continuing vocational training activities (for example, INNOVAM in NL).

The organizations of public providers (group C) and those of the social partners (group B) focus on making qualifications compatible and comparable, i.e. homogenous qualifications should be provided. The NVQ approach with four qualification levels (UK) is an example of good practice with regard to this strategy. The activities of the social partners and public organizations in a number of other countries (NL, D, E, L, F) are going in this direction.

The organizations of providers as in groups B and C play an important but not a dominant role in providing continuing vocational training. The motor vehicle manufacturers and their customer service schools, the importers and their organizations and the subcontractors of both groups dominate the sector.

Apart from the continuing training offer of centres owned by the Chambers of Trade/Guilds, Trade Unions and other bodies belonging to the social partners or public and private providers in the motor vehicle sector, the authorized dealers make sole use of the continuing training offer of the customer service schools of manufacturers and importers. The programmes offered by manufacturer-oriented providers (group A) make up the major part of continuing training measures in the motor vehicle industry and are extremely important for extending and developing the skills of employees in the repair shops and service centres of dealers. The programmes include courses for technical employees, for sales people, administrative staff and for the owners of dealerships.

Courses offered by providers in groups C and D, must be regarded as complementary courses to the manufacturer-oriented providers. The employees of independent repair shops thus have an opportunity to extend their knowledge by taking part in the courses.

Private providers (group D) do not play an important part. The relatively few providers in this category work in a market-oriented way. This means that the continuing training they offer covers those areas not covered by other providers or for which there is insufficient provision. A good example is Tecnomóvil in Spain, which mainly offers technical courses or CEGOS (P, F, I), which is active in a number of markets and focuses on management, sales and financing.

The focus of the courses offered by the four groups are:

a. technical continuing training
b. management, sales staff and customer service training
c. training for administrative duties.

The spectrum of courses offered by each group of providers depends on the infrastructure of continuing training within the sector of each country and on specific needs defined by each group of providers. The manufacturer-oriented providers focus mainly on the needs of specific makes with emphasis on technical training.

ANFA, the National Training Association for the Motor Vehicle Industry in France, is an example of good practice in representing the social partners and in providing support for an area of continuing training between manufacturer-oriented providers

Table 6.1 – Summary of the main providers of continuing vocational training in the motor vehicle industry in EU Member States

Country	Manufacturer-oriented (Group A)	Trade associations, Trade unions (Group B)	Public organizations (Group C)	Private organizations (Group D)
B	Training centres of manufacturers, importers and component producers	Small business training scheme Flemish Institute for Self-Employed Business	Public employment and training service, Social advancement education	Of no importance
D	Training centres of manufacturers, importers, sub-contractors and component producers, contractors	ZDK Chamber of Handicrafts, Chamber of Industry and Commerce	Schools for technicians, Specialized schools (Bundesfachschulen)	Academies
DK	Importer training centres	Danish Motor Vehicle Industries Employers' Association	AMU-courses, ME courses	Of no importance
E	Training centres of manufacturers and importers	Trade Unions and Employers' organizations	A number of government agencies, INEM	Tecnomóvil and some others
F	Training centres of manufacturers and importers	ANFA Federation of Motor Vehicle Repair Shops	Some institutes	CEGOS
GR	Training centres of importers	SEB, TEE, GSEE, Federation of Motor Vehicle Repair Shops	EOMMEX, ELKEP, OEEK, OAED	EEDE; some agencies
I	Training centres of manufacturers and importers	ECIPA, CNA, ENTI, BILATERALI		CEGOS, IPSOA
IRL	Training centres of importers and franchise organizations	SIMI	Colleges, FAS	Of no importance
L	Training centres of importers and franchise organizations	Guild Chamber National Institute for Development of CVT	CVT centres	Of no importance
NL	Training centres of manufacturers and importers, contractors	BOVAG, INNOVAM, OOMT		Some agencies
P	Training centres of manufacturers and importers	CEPRA, ARAN, ANECRAM, CECOA, CITEFORMA, CENFIM	IEPF	CEGOS (C), Mercuri
UK	Training centres of manufacturers, importers and franchise organizations	MITSC, IMI, RMI, ReMIT, SCOTVEC, City and Guilds	NCVQ, colleges	Some agencies

and the repair shops through courses on the basics of various areas in the motor vehicle sector. The continuing training activities of ANFA are divided as follows:

a. technical continuing training 60 per cent
b. management training, sales staff and customer service training 35 per cent
c. administrative training 5 per cent.

This overview shows that almost $^2/_3$ of almost all continuing training activities focus on technical continuing training. Such a division seems to be typical of all providers with certain variations upwards or downwards.

To sum up, it can be said that the motor vehicle sector in EU Member States has a continuing training infrastructure which is determined by four groups of providers. The dominant group is the manufacturer-oriented provider of vocational training. They cover a wide spectrum of measures needed in continuing training. The provision by trade union organizations, chambers of trade/guilds and other employer and worker organizations as well as public bodies must be regarded as supplementary to the manufacturer-oriented institutions and provide training opportunities for *independent repair shops*.

The Danish Sector Report provides data which stresses the dominance of manufacturer-oriented provision. In 1988, 68% of employees in the sector took part in courses offered by importer organizations in spite of a good infrastructure of the other three groups of providers. It can be

assumed that these figures have not changed substantially and that the figures in other EU Member States are similar.

The private providers play an insignificant part. They cover particular market segments. This group is not regarded as a private organization when it acts as a subcontractor for manufacturer-oriented providers.

With regard to courses offered by groups B and C, the participation of employees from authorized dealers is only considered when the skill needs of employees are not covered by programmes offered by the manufacturer-oriented providers. The courses provided by groups B, C and D, are very interesting for employees in independent companies, particularly when no other opportunities exist for participation in the special programmes of component manufacturers.

In countries with efficient importer, sales and service organizations, for example, franchising (IRL, UK and to a lesser extent B and NL), the spectrum of providers of manufacturer-oriented continuing vocational training is broader than in countries without this type of organization. It is noteworthy that in those countries more institutions (colleges, private subcontractors) are involved in training activities of importers or franchising organizations and that the dominance of motor vehicle manufacturers is reduced to a certain extent. Case Study 3 from the UK is a good example:

> "The providers of continuing vocational training are: the LEX group (management training and skills); the vehicle manufacturers (Seat, Rover, Landrover, Leyland-DAF); Newport College (a rather minor input), and the three specialist colleges ... Broadly speaking, the motor vehicle manufacturers provide product-based training which is very much concentrated on their vehicles. LEX provides a range of skills courses designed to facilitate the development of a management cadre with a broad base of skills. In this sense the providers of continuing vocational training are complementary. On the other hand, there are areas of overlap and potential conflict, notably in terms of management and sales courses established by the vehicle manufacturers." (UK).

Finally, it should be stated that some important component producers (such as Spare Parts Services, LUK, TEVES) have initiated a pilot project in cooperation with some *independent companies* in Germany in 1993, in order to promote repair shop development and the continuing vocational training measures in this kind of company. The *pilot project* which is called "Automeister-Konzept" (master craftsman concept) operates as a franchise system and will be transferred to other European countries in 1994 if it proves successful. This pilot project must be considered an innovative example to promote continuing vocational training measures in independent repair shops.

6.2 The training policy of providers of continuing vocational training

Manufacturer-oriented providers

Continuing vocational training is vital to all repair shops linked to manufacturers. This is a result of the issues discussed in Chapter 4, which exert an influence on tasks in the repair shops. All make-oriented case studies clearly confirm these needs with regard to guaranteeing quality service in the repair shop to a large extent. The continuing training policies of providers vary from make to make, country to country and from provider to provider. The general policy is determined by the manufacturer and is taken over by the dealers and their organizations. The main aspects may be summarized as follows:

- the content of continuing training is product-oriented to a large degree and, to a lesser extent, it is person-oriented (UK);
- the contents of continuing training are comprehensive and can be adapted to various contexts;
- continuing training should help to adapt the quality standards of repair shops to requirements, as for example, laid down by BS 5750 (UK). A pre-condition for this is an analysis of continuing training needs.

Examples:

- *FASA Renault:* The aim of continuing training is to attain as high a quality as possible in the repair shops. Dealers are trained in order to increase their knowledge of the product which they are dealing with, to provide them with sales strategies to be pursued and to acquaint them with the organization and sales management, including after-sales service. They should be able to proffer the highest quality of after-sales service.

  General policies such as sales strategy are closely related to the continuing training policy for dealers. The basic idea is to adapt to the industrial market which has changed constantly over recent years on account of factors such as technological innovation, better informed customers and growing competition with other producers (E).

- *Peugeot* has created a special position for after-sales service network, the position "technical advisor", with three main accents:

  > A technical advisor provides expertise in difficult cases of fault diagnosis.

He is responsible for disseminating technical training which he has acquired in special Peugeot courses at the manufacturers.

He provides advice to dealers in the network on continuing training as well as technical advice (F, I).

- The continuing training programme for 1992 contained, in addition to normal training, particular emphasis on customer relations and aimed to raise the level of technical skills of repair shop employees and to increase sales. In 1992, all employees took a customer contact course for a variety of reasons to increase awareness of the need for better customer service – see chapter 4 (F, I).

On account of technical change in the products over the past five years, the need has arisen to increase productivity in a repair shop, to establish customer-oriented quality service, to remain competitive, and to increase the quantity and quality of continuing vocational training provided by manufacturer-oriented providers. This requirement is mentioned in all the case studies, examples are provided by the case studies of VW/Audi dealers (I, F, D, IRL), Ford dealers (IRL, NL), Opel dealers (P, GR, UK), Seat (P, E), and Japanese makes (F, D, E, DK, IRL, UK).

The overall aim of manufacturer-oriented providers of continuing vocational training is to guarantee that employees in dealerships have the necessary and required skills to work efficiently with the help of modern methods, technologies and equipment in order to reach a high degree of customer satisfaction and to bind the latter to the dealer. This group of providers organizes their continuing training strategies on the basis of technological innovation (which is determined by the manufacturer to which the whole network of dealers is subordinated). Neither sales strategy nor employees or representatives are actively involved in deciding on continuing training activities. Scarcely any dealers have an official continuing vocational training committee or a separate continuing vocational training budget.

Providers of chambers of trade, guilds, trade unions, employees' or employers' organizations.

The continuing vocational training offered by these providers is not normally make-dependent and covers general topics in order to improve occupational skills in the sector and to complement the continuing vocational training spectrum of a variety of other organizations. This has the advantage that employees of all companies, dealers, independent companies, franchising dealers, etc., can participate in courses and that the courses are designed for all groups of employees and employers. These organizations can provide homogenous skills when they have developed a system for providing a broad basis of qualifications. Good examples are INNOVAM in the Netherlands, ANFA in France, ME in Denmark, IMI and REMIT in Britain, FAS and SIMI in Ireland, the Chamber of Trades in Luxembourg and ZDK in Germany.

Some of the providers listed above have a continuing vocational training network within their country in cooperation with suborganizations. INNOVAM (NL), ANFA (F), and ZDK (D), seem to have highly-developed networks. In cooperation with regional continuing vocational training centres they pursue a strategy of bringing continuing vocational training and courses as close as possible to the people. They also act as advisors and coordinators for other continuing vocational training bodies. In certain instances they also prepare and implement continuing vocational training policy.

An innovative example of activities of the type described above, is the ZDK (D) initiative to introduce continuing vocational training for certified service technicians which commenced in September 1992.

Public providers

To date there is no network of public providers in the European Union. In some countries, institutions do exist which aim to offer continuing vocational training for unskilled, skilled workers and "other groups".

AMU, the National Labour Market Authority is the main provider of continuing vocational training in Denmark after the importer organizations. Activities in this sector are being reduced because importer organizations are extremely dominant. The activities of the "Public Employment and Training Service" in Belgium are comparable with the activities of the AMU. NCVQ has become firmly established in the UK. It pursues a strategy of offering broad qualification levels. This approach helps to overcome the make-orientation of other providers and to develop compatible qualifications, which is one of the main interests of public providers.

In other countries (D, IRL, UK), colleges are involved in continuing vocational training in the sector. Many types of courses are offered in the UK and Ireland: full-time and evening courses, courses of longer duration, etc. Some courses are offered in cooperation with franchising or import organizations or by the manufacturers. Their aim is to prepare employees for a variety of tasks in the repair shop through adapting courses to the demand for continuing vocational training.

College instructors have the opportunity to take part in the courses organized by the franchising or importer organizations or by the manufacturers.

In Germany, motor vehicle technical schools offer two-year continuing vocational training courses to prepare employees for practical tasks in the sector. There are, however, only a small number of these technician schools in the sector.

Private providers

The studies do not report on particular policies by private providers in the motor vehicle sector. They work in a market-oriented way and offer continuing vocational training for those areas which have been neglected by other providers. The courses are oriented more towards basis topics than towards special topics in the motor vehicle trade.

6.3 Contents of courses offered by providers

The contents of courses differ from one provider to the next. The main characteristics are discussed in the following paragraphs.

Manufacturer-oriented providers

They offer a broad spectrum of market-oriented contents for the dealer network:

- Basic technical courses – these courses must be taken by mechanics in order to acquire knowledge of specific technical details of the particular make of motor vehicle;
- Special technical courses – for experienced mechanics who wish to or must prepare for new tasks, for example, as a technical specialist or high-tech specialist in their occupation. The courses focus on fault detection and problem diagnosis using modern electronic systems;
- Courses for new models and products – these are normally offered when new models come onto the market;
- Sales courses – these comprise sales and communication techniques and are designed for sales staff and official dealers;
- Management courses – these are designed to bind the customer to the motor vehicle make and also include general management training.

In these, the technical contents predominate. By means of these courses the providers attempt to raise the employees' skills to a certain level or to maintain this level, which eventually has consequences for customer service.

However, technical training is losing ground to management issues, managing customer service and customer relations in the sales and service sections.

The provision by chambers of trade/guilds, trade unions and other employers' and employees' organizations (social partners)

The contents of courses offered by these providers are not make-dependent and cover a broad spectrum of topics for all categories of repair shops:

- Courses for self-employment – they are designed for those intending to set up their own business (economics, legislation etc.);
- Commercial courses – aimed at sales staff (sales techniques, communication techniques, behaviour towards the customer);
- Company management courses – office organization, stock administration, company accounts, budgeting;
- Management courses – management concepts, relations to employees, customer service, work organization;
- Continuing training courses in motor vehicle inspection – introduction to regular technical inspection, brake inspection, etc.;
- Courses to obtain a certificate enabling employees to carry out exhaust emission control checks;
- Continuing technical training courses – basic courses on applied electronics or other specialist areas (for example, MAG-welding, repair of plastic components), advanced courses in components and systems (fuel systems, engine management, etc.).

The contents of these courses offer good opportunities for all those employed in repair shops to improve their skills and their knowledge from basic to advanced levels.

The spectrum of courses includes all areas of activities which an employee must master in the repair shop. Normally, the course spectrum is wider than that offered by the manufacturer-oriented providers.

Public providers

Usually, public providers offer the same spectrum and same course content as the social partner providers. It can be assumed that these courses focus more on basic knowledge than on applied technology and that they supplement the advanced courses offered by other providers.

Private providers

Private providers offer courses with a variety of contents. The main courses are management, sales and administration.

6.4 The training concepts of those providing continuing training

All continuing training concepts developed by the various groups providing training focus on employees in the repair shops. However, differences in concepts may be ascertained. The most important strategies of those providing training are examined in the following discussion.

Producer-oriented provision

Producer-oriented providers pursue the concept of *international differentiation and modularization of curricula*. Two main streams have developed:

a. Stream I: Variation A

In recent years the providers of continuing vocational training have developed a stable concept and a structural design of continuing vocational training courses. It is worthy of note that the spectrum of topics currently seems to have stabilized while increasing constantly over the past decades.

The main task is and remains the continuing vocational training of technical staff and of sales and management staff.

A broad range of courses are offered, the contents and concepts of which are constantly updated. The recent spread of electronic components in motor vehicles and the networking of various systems in complex networks implies growing pressure to further train repair shop employees and a constant adaption of continuing training content.

For example, in the past year, Opel/Germany offered 113 days of continuing vocational training. The Opel range of training courses comprise (see Rauner/Zeymer 1991) the following:

	Total training days per year
Technical specialized training	113
Behaviourial training	25
Special training for management	28
Customer service management training	25

The number of training days for non-technical subjects is also increasing steadily.

This training at Opel (P) is divided up into a *basic level and three – sometimes four – subsequent advanced levels.*

Other providers of continuing vocational training have similar structures. Continuing vocational training in the central customer school of Mercedes-Benz has comprised for some years 170 continuing vocational training days (D) for specialist technical training. If the number of courses given are also considered, this makes for a total 2,630 continuing vocational training days per year in the central customer school alone.

The Opel course concept (P) contains a description of the various courses required for subsequent courses or follow-on courses. As a result, *the whole concept is organized in a flexible module system.*

Diagram 6.1 shows how this module system for specialists in motor vehicle electrics/electronics can be organized. The concept behind the module system is the following:

1. Course participants who will assume responsibility in this area in a company in the area of motronics (T 8.2) must complete courses in the module series E – T4 – T8 – T8.2.

2. The course structure is designed for greater specialization in fields of activity, i.e. a greater degree of specialization.

3. A high degree of specialization in repair shops can only be prevented if the employees take courses from a number of module series. However, this would greatly increase the need for continuing vocational training.

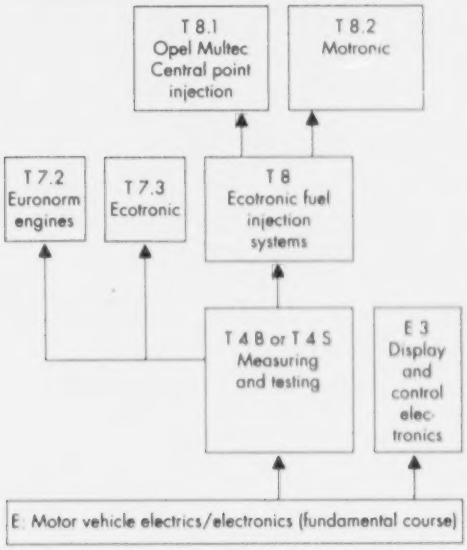
Opel's technical *continuing vocational training* concept is shown in Appendix 1. It can be termed a *module system* in the form of a *comprehensive curriculum* (P). It can be used by repair shops within the dealer network for continuing vocational training of employees in the way described (point 1).

Opel applies the continuing vocational training concept of its customer service schools without making major changes to other European countries.

A similar concept was introduced by Ford (see NL, IRL) and is shown in Annex 2.

Both systems are in principle similar in their horizontal and vertical structures. They have the advantage that employees may use the system in an extremely flexible way. Depending on their individual skill levels, participants may take the whole series of modules or they can take only those courses which they require. The use of the module concept in this flexible form would markedly reduce the need for continuing vocational training.

Diagram 6.1 – The module system of courses



b. Stream I: Variation B

Other manufacturer-oriented providers use a continuing vocational training concept which can best be described as a "reduced module system". This topic should be discussed in combination with the findings of the four case studies carried out in VW/Audi companies (I, F, IRL, D).

The concept is built on a three-phase model of continuing vocational training of repair shop employees:

1. Basic training (basic level)

This basic training is targeted at new recruits joining from competing companies or employees who, for a period of time, have not worked with the components of a particular motor vehicle make.

Basic training is designed for employees who must improve their technical skills, for example, for retraining from mechanics to electronics, for motor vehicle bodies or spraying.

2. Advanced training, Phase 1 (proficiency level: mechanic)

Here, repair shop staff can improve and build upon their skills in routine work. Continuing vocational training at this level is divided up into various areas, engines, fuel and ignition systems, gear systems, bodywork, electrical systems, motor vehicle spraying.

3. Advanced training, Phase 2 (technical level: chief mechanic)

This level is designed only for employees with high skill requirements in motor vehicle repair. Level 2 enables participants to develop strategies to solve problems individually. The continuing vocational training topics examine only customer complaints and can be described as "clear cut fault detection and adequate repair".

The prerequisite for participation in level 2, is knowledge of related topics as provided in level 1.

These levels are taken one after the other (see F, D). There are also possibilities to specialize in certain areas.

The results show that "module series" leading to certain levels of qualifications are less stringently tailored. Like many other providers of continuing vocational training, they offer a three-level qualification model for continuing training.

The structure of the module systems

The basic training courses offer basic training for motor vehicle mechanics and for customer service staff. Motor vehicle mechanics who change makes or who wish to gain knowledge of other makes participate in the more important continuing vocational training courses.

The *basic courses* are designed in such a way to ensure that differences in skill levels as a result of differing initial vocational training paths can be compensated for. The continuing vocational training courses at level 1 focus on individual components. Special emphasis is laid on new or differing trends in known standard versions. This means that specialization is aimed for even at the basic level. The advanced courses in level 2, offer further specialization in an area of activity, for example, "Specialists in Motor Vehicle Electronics". The demand for qualifications in fault diagnosis and repair of electrical components and aggregates is considerable. Apart from operating programmed diagnostic equipment, it also includes skills to eliminate unexpected faults and to repair them.

To sum up, it can be stated that the current continuing vocational training plans of manufacturer-oriented providers of continuing vocational training show clearly that the latter have a wide continuing training concept for employees in repair shops. These concepts encompass all topics needed to manage a repair shop and are oriented towards the various operational levels in the repair shop.

The model concepts are structured both horizontally and vertically and can be used in a differentiated way by employees. All important topics are covered. The structure of the model concept described here, focuses on more specialized work organization in the repair shop.

Through taking part in courses in different module series, an employee can become highly flexible and acquire a larger variety of skills. The converse is also true.

c. Stream II

Stream II is clearly dominated by Japanese manufacturers. Primarily Toyota and Nissan are leaders in adapting the continuing vocational training structure to the requirements of dealers (NL, Sector Report).

The Toyota organization has a continuing training scheme which trains employees at four different levels:

Level 1: mechanical maintenance
Level 2: technician (focusing on mechanics)
Level 3: master technician (focusing on electronics)
Level 4: high-tech master technician (focusing on diagnosis).

The mechanics take all courses within five years. Subsequently, they participate regularly in in-company continuing vocational training courses in order to keep their knowledge up-to-date.

Recently, Nissan introduced a new job structure for technical staff in repair shops. The term "mechanic" has been replaced by "technician".

The programme ensures that each employee in a technically-oriented company in Europe receives continuing training in a modular form and in line with set standards. The courses lead to qualifications such as (IRL):

- Technician
- Specialist
- Senior Specialist
- Master Technician.

A particular feature of the continuing vocational training concept for repair shops of Japanese manufacturers is that the programmes

- are closely adapted to the level of prior initial training in the various countries, and that
- the continuing vocational training concepts are developed in close collaboration with those providing continuing vocational training in order to reduce initial training efforts.

The four levels of training in Toyota and Nissan are not provided in all EU Member States. For example, in Ireland, Nissan provides training in all four levels while in Germany continuing vocational training usually starts at level 4, as all other levels have already been attained through initial vocational training or external continuing training.

If one compares the concepts of continuing vocational training for repair shop employees in Japanese and European manufacturers, the following main differences may be determined:

- Japanese providers apply their concepts more flexibly and adapt these to the level of initial training in the various countries;
- Japanese manufacturers treat the product- and component-oriented module system of continuing vocational training less rigorously than their European counterparts.

  They function with a type of open system, i.e. continuing vocational training courses can be adapted to the individual needs of employees and companies within the framework of the courses offered. Participation in these courses is fixed according to this design. The concept's advantage lies in the fact that a relatively close adaption can be made to training requirements and available training on offer. Through matching the continuing vocational training concept to the specific national context, and as the course programmes for the employees are tailor-made, continuing vocational training courses are reduced for the provider. A precondition is a detailed analysis of continuing vocational training data of employees within a dealer network.

Provision by trade associations, trade unions (social partners)

Committees in a number of employer and employee associations are involved in developing a continuing vocational training concept for these providers of continuing vocational training.

Two issues are relevant for the development of such a continuing vocational training concept:

- Does it lead to a certificate?
- Does it cover skills deficits?

If a particular course leads to a particular certificate, the providers usually formulate a comprehensive course concept which covers all topics corresponding to the requirements of such a certificate. Most curricula are very systematic and the topics covered are closely related to each other. It can be assumed that these concepts are less work process-oriented than those of manufacturer-oriented providers. Usually they are make-specific and the courses are available for all employees in repair shops, and for independent repair shops. A formal requirement for participation is usually determined (for example, a particular level of initial training, several years of work experience, etc.).

The master craftsman training in Germany (ZDK) and Luxembourg (Chamber of Trades) and the

CQP Concept (Vocational Qualification Certificates) in France (ANFA) are typical examples of such a design.

If a design aims to compensate for skills deficits in a particular area, appropriate courses are organized. This should avoid the creation of a system with a number of courses in areas for which there is no demand.

Public provision

In general, public providers of continuing vocational training pursue the same strategies as their competitors from employer associations and trade unions. In certain areas, they focus more on concepts of initial training for minorities and are work process-oriented. The courses are usually very structured.

Private provision

On the one hand they focus more on individual areas within certain activities (for example, data processing). On the other hand they offer course design for interesting areas as, for example, continuing vocational training in "handling customers". On account of their market orientation these courses are usually well prepared and cover interesting areas.

Transferability

The transferability of continuing vocational training courses varies. To a large extent this depends on the type of concepts developed or to be formulated. As stated earlier, a number of continuing vocational training courses of the *manufacturer-oriented providers* have been specially prepared to enable them to be transferred within a dealership network throughout EU Member States. This is already feasible on account of the more or less intensive adaptation to the conditions prevailing in the various countries.

The module concept (Stream I – see above – pursued by a number of European manufacturers) has already been transferred between a number of EU Member States with little changes being necessary. The concept of a number of Japanese manufacturers (Stream II – see above) has already been transferred to several EU Member States taking into consideration the particular national context. This means that this concept was adapted with different qualifications strategies. The aim is to develop the required qualifications.

The training concepts of all other – *non-manufacturer-oriented* – providers are usually not transferable to other EU Member States as they have been created for the particular needs and conditions of national or even local markets. Parts of these can be transferred to a certain extent if they contain sections on specific themes which are of importance internationally.

None of the concepts have been developed specifically for transfer to other sectors.

Trends which could influence future continuing vocational training concepts

With regard to system technology in motor vehicles (see chapter 4), detailed and overall knowledge must be imparted through training. To survive in this sector, an understanding of functions and their interrelationships is vital, as is mastery of the whole spectrum of measurements, testing and diagnostic technology. The question of the formal level of special training is difficult to answer. Depending on the internal work organization, the structure of the continuing vocational training courses and the certification practices of providers the answer will vary. Tasks within the area of motor vehicle mechanic may be assigned to:

- a specialized motor vehicle electronics mechanic or master craftsman, or
- a qualified "service technician" or "diagnostic technician", or
- a motor vehicle mechatronic, should this post exist.

The focus or specialists in motor vehicle electrics and electronics is gradually shifting towards system-specific differentiation of repair shop employees (see VW/Audi, levels of continuing vocational training). Opel differentiates between the following areas in continuing vocational training:

- comfort and safety electronics,
- injection systems, electronic engine management and diagnosis technology,
- mechanical and automatic gearboxes,
- inspection of systems,
- spraying and bodywork,
- light commercial vehicles and ATVs.

This new orientation is consistent as electronics is a transversal technology within motor vehicle technology and because a specialization in the continuing training in line with systematic criteria, such as electronics, hydraulics, mechanics, etc., would lead to a reduction in practice orientation and thus to a loss in the significance of qualifications.

In general it can be stated that each motor vehicle manufacturer focusing on middle-of-the-range and luxury vehicles, has followed the trend towards increasing electronics much earlier than others and introduced the informal task of technician much earlier and has developed corresponding training schemes, for example:

- "System Technician" (Bosch)
- "Service Technician" (BMW) (D)
- "Diagnostic Technician" (BMW) (D).

The training concept of the German trade associations in the sector (ZDK, VDA, VDIK – see Sector Study, D), which has just been developed and leads to a qualification as "Service Technician" is a response to these trends. This is an integrated concept. It does not differentiate between various specialities and an improved version could lead to the occupation of "Motor Vehicle Mechatronic". This trend was described in chapter 4 as a future challenge. New contents of a new quality of work are taken into consideration. Employees in the repair shop must be aware of new environmental legislation, new exhaust fume pollution legislation, regulations on technical inspection and must know how to use new tools, new diagnostic equipment and new means of communication.

6.5 Training concepts at repair shop level

At repair shop level there are various continuing vocational training concepts.

6.5.1 Authorized dealer repair shops

The continuing vocational training concepts in authorized dealer repair shops are based solely on the training offer of manufacturer-oriented providers. The repair shops are usually guided by this offer and the adaptation of the topics on the courses. Rarely do they have their own (often provisional) model (L, IRL, DK).

On account of the changes in tasks and the aim of satisfying the customer, a number of continuing vocational training concepts are applied in authorized dealer repair shops. The models were described in detail in chapter 4.4:

- Specialization model

  A repair shop using this model tries to ensure that each employee attends courses in line with the specializations which are offered by the provider (for example, customer service schools). If there is a high degree of specialization in the repair shop, each employee must participate only in a small number of courses.

- Multiplier and cascade model

  This model focuses on continuing vocational training courses in which a limited number of trainers or what are termed multipliers or technical advisors are trained by the manufacturers (D, F, L, I, E). The multipliers are responsible for disseminating the knowledge and techniques they have acquired within the firm through internal training days in the form of in-company continuing vocational training. Such a model requires a comprehensive plan for in-company continuing vocational training at repair shop level in order to ensure the transfer of skills to other employees.

- Comprehensive model

  The aim of this model is to provide employees with a broad basis of skills. This means that the training providers must offer continuing vocational training for all repair shop staff. The provider's ability to offer the required number of courses (F, DK) depends on their continuing vocational training concept and their training capacity.

The decision as to which model to apply is influenced by the manufacturer. The continuing vocational training offer is adapted to the model which has been applied.

In repair shops applying the *specialization or comprehensive model*, it is usually the foreman who, in cooperation with the owner or manager of the repair shop, takes the decision as to which employees should participate in which courses offered by the providers. The selection criteria depend on the needs which are formulated by the foreman. He tries to keep skill levels in his department up to date and attempts to guarantee a level of qualifications which is sufficient to keep pace with particular trends. The employees' wishes for continuing vocational training are usually taken into consideration when they are in line with the tasks of the repair shop and the continuing vocational training planned. The comprehensive model ensures primarily continuing vocational training of a large number of employees provided the training capacity is available. This creates opportunities for providing employees with a broad range of skills and capabilities.

Where the *multiplier or cascade model* is implemented, the multiplier participates in courses given by the manufacturer-oriented provider. He then in turn passes on this knowledge and these skills to employees in the repair shop through short repair shop classes or in-company training meetings. Case Study 3 in Germany describes: "When mechanics have taken a course they arrange an internal seminar for all staff involved. Here the content of the new knowledge is transmitted to other employees. This is the most important point: the knowledge does not remain the monopoly of an individual but information reaches all who require it". Self-learning programmes are also adopted which facilitate continued training in the repair shop and help to solve current problems. This increases the employees' knowledge and the newly-acquired skills can be applied at repair shop level.

The *multiplier and cascade models* are the oldest models and were applied in the past when the

master craftsman trained his son. If functioning properly, this model entails low costs with a high level of know-how transfer. It requires, however, an institutional framework which causes problems at times in repair shops. The model aggravates polarization of qualifications and a hierarchical orientation of task splitting. This decreases opportunities for quality service in quality repair shops.

6.5.2 Independent repair shops

Independent repair shops usually have no continuing vocational training concepts for the repair shop level (P, DK, GR). These repair shops are frequently confronted with three problems:

- on account of the small size of companies (usually size I, sometimes size II) the absence of employees who are undergoing continuing vocational training has negative consequences on turnover.
- There is an absence of courses which are tailored to the needs of this type of repair shop.
- The small number of employees makes in-company continuing vocational training impossible. On the other hand such companies receive no training materials from the providers.

As is the case with authorized dealers, in independent repair shops there is a great need for continuing vocational training as they must offer their services under the same conditions as other repair shops.

Independent repair shops do not have sufficient funds to implement continuing vocational training concepts at repair shop level. Their only means of keeping employees abreast of training is to offer them non-manufacturer-oriented courses offered by parts producers and courses offered by public providers and by the social partners. The limited opportunities result in a skills deficit which prevents independent repair shops from carrying out servicing and repair work on new motor vehicles. There is a substantial time lag in them being kept up to date with new knowledge. *"Study in one's own time"* (DK) and learning at the workplace are continuing vocational training concepts preferred by such repair shops. However, there are no specific measures to promote learning at the workplace which would make such a form of continuing vocational training much more efficient.

6.5.3 Transferability

None of the concepts at repair shop level is designed for transfer to other sectors. Transfer within repair shops in each sector is possible when the applied work organization forms and the provider concepts (the models applied) are identical.

The most favourable model is the comprehensive approach which produces employees with broadly-based skills or motor vehicle megatronics who can guarantee quality service.

Regarding the transferability of concepts, mention must be made of increased effort to introduce self-study programmes at repair shop level. A number of manufacturer-oriented providers offer such training courses on video, in brochures and in PC programmes. Such courses focus on two areas: the programmes help the employees to become acquainted with the latest technical trends – for example, in new engines, remote control, the operation of new sunroofs, etc. On the other hand these courses are designed in such a way that they prepare participants individually to take part in seminars which are held in the customer service schools. Such a strategy increases the scope of in-company continuing vocational training. Such a concept could, however, offer opportunities for independent repair shops to guarantee their employees a minimum of continuing vocational training.

6.6 The need for individual continuing vocational training

Ultimately the need for continuing vocational training is the interface between various groups providing training and the repair shops. The repair shops require skilled manpower in order to provide the quality service they aim for. They have only two opportunities to maintain a certain level of skills:

Firstly: they can send their employees to those providing continuing vocational training.

Secondly: they can train employees themselves in what are termed in-company continuing vocational training courses or through learning at the workplace.

To obtain an overview of the skills required, an analysis of needs must be carried out.

Systematic analysis of training needs have only rarely been carried out by providers of continuing vocational training at repair shop level. Only one case study (NL) reports on such a systematic analysis which was carried out by INNOVAM on behalf of the Ford importers group in the Netherlands. The analysis comprised some 250 Ford dealers with some 1800 employees. The findings of the analysis showed "clear discrepancies which exist in dealer companies between skills that are available and those that are required for work (NL)". These findings stress the importance of needs analysis and the formulation of a list of continuing vocational training requirements if quality service and customer satisfaction are the aim in the sector. They also stress the need for constant continuing vocational training.

With the exception of the systematic needs analysis mentioned above, the normal procedures for ascertaining continuing vocational training needs were carried out in the same fashion as manufacturer-oriented providers and other providers in groups B, C and D.

Needs analysis by manufacturer-oriented providers of training

The preparation of continuing vocational training schemes is influenced mainly by departments responsible for developing new technologies. Manufacturer-oriented providers receive feedback from the dealers. At dealer level the foremen report on faults they have found. The employees discuss with the foreman those areas in which they require more knowledge and the requirements which they must fulfil. The results of these talks are then reported within the dealership network by inspectors or trainers to the providers of training and thus constitute important elements for developing new continuing vocational training programmes.

Several companies have even created the position of information officer or service delegate (D, F, L, B). He is either employed by the company or visits the company frequently and maintains contact with the manufacturer. With the companies, he discusses continuing vocational training needs which have arisen on account of changes in tasks (change of product, fluctuation in the staff, changed legislation, etc.) and passes this information on to the manufacturer, who plans continuing training and the customer service school. This procedure, however, still has shortcomings.

Another important factor is skilling employees before a new product is launched (IRL). Depending on the scope of change to the product, new courses are designed or existing courses are modified.

In order to quantify the need for continuing vocational training, the continuing vocational training measures of those providing training are assessed. Deficits in understanding new systems are formulated with the course participants and are taken into consideration in preparing new courses.

The course design is also frequently influenced by information received from the warranty department on systems and components. Should a large number of faulty parts be returned to the manufacturer because faults could not be found in a system or a component in the repair shop, courses are developed to enable the repair shop employees to solve the problem.

To summarize, it can be stated that analyses are influenced by a variety of factors. They may be carried out in a product-oriented manner (and not according to standardized criteria) or they may be the result of individual talks with partners at repair shop level. The transfer of this information in a structure which does justice to all requirements is the responsibility of the planner and provider of continuing vocational training. The dominant role of the manufacturer should not be underestimated. The needs analysis formulated on the basis of available information is dominated by manufacturers. Consequently, the training plans at repair shop level of authorized dealers are based exclusively on the training offer of manufacturer-oriented continuing vocational training providers. The authorized repair shop dealers are guided by this offer and the modification of topics in the programme.

A still unknown factor in designing continuing vocational training is the skills level following initial training which has a considerable influence on the scope of the continuing vocational training. The main aim of a needs analysis is to enable repair shop employees tc keep pace with changes in tasks in the repair shop. This implies at dealership level that the employees must receive continuing vocational training to the extent that this is required to maintain skill levels. This skilling of personnel also facilitates economic repair and maintenance of motor vehicles and imparts skills in connection with increasingly complex systems and innovative technologies in new models. In continuing vocational training employees see more an opportunity to maintain their skills than chances for promotion in a company.

Needs analysis by trade unions

Trade unions are not directly involved in needs analysis or in the planning and implementation of continuing vocational training activities by manufacturer-oriented providers. At the manufacturer level, they are usually informed of continuing vocational training measures and at repair shop level can actively participate in the above-mentioned analyses.

There are only a very limited number of trade union representatives at repair shop level. There is little trade union organization and their influence is small. Only in a limited number of case studies (D) are there reports of trade union representatives. Thus, it can be assumed that trade unions are scarcely represented in repair shops of size III and smaller. This applies to companies which are authorized dealers and to independent repair shops.

Needs analysis by trade associations

Concerning the analysis by trade associations it must be assumed that the decision-making bodies are manufacturer or repair shop-oriented. To the extent that they are manufacturer-oriented, the findings are universally true. If they are more

repair shop-oriented, for example, Chamber of Trades, bodies of independent self-employed (B), REMIT (UK), ZDK (D), TEE (GR), CEPRA (P), or if independent organizations cooperate (such as ANFA (F) and INNOVAM (NL), the following trend can be observed:

a. product innovation on the part of the manufacturer and legislation (safety regulations, exhaust emission regulations, regulations on motor vehicle inspection, brake testing, etc.) exert a considerable influence on the design of continuing vocational training programmes.

b. The repair shop-oriented decision-making body guarantees that the demands of repair shops and the problems with which they are confronted influence the design of continuing vocational training.

c. The representatives of independent repair shops in these committees guarantee that repair shop-oriented associations formulate a continuing vocational training offer for employees in such repair shops as the latter have no access to courses offered by manufacturer-oriented providers, with the exception of courses given by component producers.

The authors assume that the share of these employees throughout the EU Member States amounts to some 25–30%.

The response of this group of providers of continuing vocational training to training needs of the members is the main reason for such a segmentation of the continuing vocational training offer, as these schemes are meant to fill gaps in the overall training offer. On the other hand, this group offers comprehensive training measures, for example, master craftsmen courses in Germany and Luxembourg.

Analysis of needs by public organizations

Needs analyses by public organizations are determined by their aims. These aims depend on the extent to which certain certificates should be attained through continuing vocational training and on whether continuing vocational training should only aim to reach a certain target group (unemployed, handicapped, etc.). Thus, the training aims cover a large spectrum of tasks and are for a lengthy period of time (several years). They impart skills which are not product-dependent and react quickly to change.

The courses given by these bodies are used by employees from all types of companies. Reports from Denmark, Germany, Netherlands, Ireland and the United Kingdom ascertain that the training courses are used usually to obtain broadly-based qualifications in order that employees have greater chances on the labour market if employment trends change or if new tasks are taken over by a company.

Needs analysis by the private training providers

The private providers of training use very different methods to carry out needs analysis of continuing vocational training and design their training offer to fill the gaps in the market which such analyses reveal.

6.7 Transfer of continuing vocational training in the repair shops

Rapid product innovation (for example, end-of-line programming of control components) is making in-roads into an unlimited number of motor vehicles. Quality competition and the need for improvement in customer satisfaction are prompting calls for increasing continuing vocational training.

The case studies reveal that employees in the authorized dealer repair shops received on average

4.5 days

continuing vocational training annually in a manufacturer-oriented training centre. In some cases they received

7.5 and 9.5 days per year.

In-company continuing vocational training on average amounts to

1.5 days per year

as revealed by the questionnaires assessed.

Self-study, at the workplace or at home amounted to

1.5 days per year.

The extent of training at the workplace is unknown.

The Greek case studies report a maximum of 23 days. The average need of employees interviewed amounted to 6–8 days annually and showed an increasing tendency towards in-company courses.

Evening courses and courses of long duration provided by non-manufacturer-oriented providers were not taken into consideration.

Strategies used to master costs of continuing vocational training

Developments require strategies to provide continuing vocational training in the motor vehicle sector. The following strategies should be proposed and are being used commonly at present:

- A further shift of continuing vocational training to the repair shop level by means of in-company training courses;
- Extending computer-assisted diagnostic techniques through greater use of sensors, self-diagnostic techniques, expert systems and diagnosis communication systems between motor vehicles, repair shops and central diagnostic units;
- A further increase in the interval between services;
- The integration of course material in computer-assisted stations;
- Improving and extending the continuing vocational training offer by the manufacturer-oriented providers which are at the disposal of both dealers and independent repair shops.

The case studies prompt the conclusion that the first model is the one most commonly used in the EU Member States. It requires therefore greater analysis.

In this model the manufacturer-oriented provider of continuing vocational training focuses on the ability to carry out certain tasks, for example:

- the development of training programmes for the whole organization;
- highest level coordination of continuing vocational training (the allocation of courses among the customer service schools, repair shops, experts; financial support, support for problems which emerge);
- carrying-out a certain part of continuing vocational training on behalf of particular groups (for example, management, training master craftsmen, troubleshooters);
- support for extending decentralized training centres;
- drawing up teaching materials and teaching aids;
- provision of information on products; and
- continuing training of trainers in decentralized continuing vocational training centres.

In line with this strategy, the customer service centre offers important courses, primarily on new trends but also for employees involved in sales, marketing and for management. However, on account of financial restrictions it cannot extend its offer of continuing vocational training. On this account, the master tradesmen, the troubleshooters and trainers in decentralized training centres are the main target of continuing training. The individual companies are becoming increasingly responsible for implementing standard training in traditional technology. If the financial situation and training capacity permits, the companies must face this challenge for two reasons:

- in order to make a repair shop efficient or profitable there is a need for skilled employees who are capable of carrying out efficient maintenance and repair work, even on high-tech motor vehicles.
- An increasing number of regular customers can only be bound to a firm for a lengthy period if good service and good and reliable customer service is offered both at the organizational and repair shop level.

The shift of continuing vocational training activities to the company level implies a reduction in direct communication between employees and manufacturer. The manufacturer thus loses an important source of information and both the manufacturer and the customer service school are not in a position to give targeted support to repair shops in eliminating faults in new products.

To ensure communication and feedback between manufacturer and repair shop in line with this philosophy, additional instruments must be used: on-line connections, technology advisors, organization and marketing become necessary. Finally, it must be ensured that continuing vocational training in conjunction with the conditions in the company can raise the quality of training. In spite of this, conditions must be created, for example, skilled trainers, material and training rooms. Such a concept opens opportunities for a practice-oriented assessment of the product. The extent to which such a concept is successful depends on the relationship between the manufacturer and the repair shops which is based more on feedback and cooperation than the current structure in which supervision is more common.

6.8 Continuing training target groups

As described above, the target groups for continuing vocational training are determined in the formulation of continuing vocational training plans at provider and repair shop level. The scope of courses and the number of target groups have increased significantly. Currently the following groups are receiving particular attention:

- courses for managers of customer service organizations, their subsidiaries, their general agencies, etc.;
- courses for managers in repair shops and customer service staff;
- continuing vocational training for trainers and instructors in decentralized training centres;

- courses for particular target groups, e.g. large customers, authorities, experts and members of trade associations;
- courses for technical staff and for employees in administration and customer service;
- formulation of training courses for in-company training and for individual decentralized training centres;
- pilot training courses for new programmes, development of future training, multi-media and distance learning courses.

Access to continuing vocational training

The courses offered by manufacturer-oriented providers are aimed exclusively at the employees in authorized dealers. Repair shop staff of other makes or independent repair shops are not permitted to take such courses. Participation of dealer employees in courses depends on the continuing vocational training aims of the company. The dealer must pursue this concept and must select participants according to its criteria. The providers offer catalogues which describe the courses available, the target groups, course aims, content, duration and venue. Certain courses are also open to trainers working for public providers (IRL, Sector Study). There are also courses for multipliers working in public bodies.

The employees in independent repair shops can only take part in the courses given by providers in groups B, C and D. These courses are open to every employee in the sector.

Component producers often offer courses for employees in independent and dealer repair shops. The courses are exclusively product-oriented, i.e. they involve only the operation of diagnostic systems, testing equipment, measurement equipment, etc. (D). Courses for minorities and for disadvantaged groups are offered to a modest extent by non-manufacturer-oriented providers. Belgium, Denmark and the Netherlands report that certain courses exist aiming to integrate the above-mentioned groups in the sector.

6.9 Teaching strategies of the providers of continuing vocational training

Given the variety of strategies and teaching methods, didactic and media concepts can only be discussed here in brief.

The customer service schools serve as an example of good practice (F, P, E, L, DK, UK, D). Training is carried out with the aid of an integrated learning setting and makes use of teamwork or working alone on original parts, systems or motor vehicles. To elucidate the structure and function of components and systems, cross-sections and technical components are used for demonstration and work purposes. This ensures integrated learning (theory-practice integration). Theoretical and practical capabilities are learned simultaneously. The findings from an assessment of the questionnaire in the case studies point to this fact. In technical continuing vocational training at least 50% of training content was devoted to practical exercises. Training focused on practice with theoretical explanations as a supplement. To facilitate skilled work in maintenance, repair and diagnosis, exercises were carried out to ascertain typical faults. Equipment common to repair shops such as handbooks, service manuals and PCs containing latest data and system descriptions were used.

To this extent the customer service schools vary greatly from other providers of training. They have overcome the separation of theoretical and practical training and focus not on work by example but on real working situations. They do not concentrate on particular systems, but are work process-oriented and support the necessary abstraction processes using original media such as the motor vehicle.

This didactic concept outlined has not yet been attained by many other providers. Private training providers must become more open to this trend.

In spite of extending the continuing vocational training capacity, in a number of manufacturer-oriented providers it is still insufficient to provide each employee in the dealership with suitable and frequent training. On account of this and because of the low costs, many manufacturers have become involved in creating and using computer-assisted continuing vocational training and self-study programmes. The video and PC training programmes have two aims: they help the employee to become acquainted with new technical developments through self-studies in the repair shop and the programmes also can prepare employees for participation in continuing vocational training courses offered by providers.

With regard to the type of continuing vocational training courses offered by the manufacturer-oriented provider, it can be stated that there is a clear trend towards openness to new training methods for continuing vocational training of employees in the dealer network. Correspondence courses and/or in-company continuing vocational training using interactive media are only two examples of this. To date, the majority of continuing vocational training courses are held in the customer service schools.

Two examples illustrate the endeavours to organize continuing vocational training in such a way as to increase quality and efficiency:

a. Example I (D3)

In future, developments in continuing vocational training will focus increasingly on providing repair shop staff with good knowledge of network electronic systems and components. Mechanical tasks are becoming increasingly unimportant. The head of a customer service school states: "In 1985 we started with 7 different diagnostic systems, today we have between 20 and 25. By the mid-90s there will be 60. At the same time, we must devote attention to new trends and improvements such as the ABS system, the air bag or the vehicle distance control system. These innovations are the subject of a seminar prior to their introduction to the market. Following this, new content is integrated into the various continuing vocational training courses."

A possible response to this trend is the TIS concept (Technology Information System) of BMW which is to be introduced in repair shops in the course of 1994. The TIS concept is an expert system for diagnosing complex systems and for enabling the motor vehicle mechanic to make a diagnosis on the basis of his personal experience, intuition and the results of the findings given by the diagnostic equipment. The control screen of the future will be divided into three parts: a wiring system plan, a representation of the component parts concerned and the values measured.

b. Example II (D4)

In spite of a certain increase in continuing vocational training, capacity is not sufficient to provide adequate training to employees in the repair shop. For this reason and on account of skill deficits in a number of employees, the Mercedes-Benz customer service school has developed new computer-assisted media. Each repair shop will be equipped with a practice computer, giving each employee the opportunity – depending on his skills and time available – to select his personal learning method and speed. The computer-based training (CBT) offers general topics with which every employee is confronted. When an employee has some time, he can go through the lessons at the workplace. In the future, continuing vocational training seminars will be stored on this type of media and will no longer be given in continuing vocational training centres. Thus, they are always available for self-study for repair shop employees.

The Mercedes-Benz project AKUBIS (acronym for service-oriented information system within the vehicle industry) in cooperation with German Telecom, a branch of the Frauenhofer Institutes and SEL, is innovative. This system offers continuing vocational training in the form of a video-direct dialogue between various geographical locations. It will provide opportunities for video conferences between, for instance, the Esslingen customer service school and up to 15 other locations. The transmission is either by ISDN (integrated services digital network) or via satellite (particularly for transmitting abroad). 300 participants can take part in a teleconference and they communicate directly with the trainer in Esslingen.

A future training programme might have the following form: after the introduction of the problem by the instructor, and having answered initial enquiries from the participants in several decentralized locations, the participants begin practical exercises prepared in advance at all conference sites. The conference line will be interrupted for the duration of these practical exercises. Following this, individual experiences and problems which emerged during the exercise will be handled in depth with the help of video demonstrations which were recorded in participating venues. A discussion between the trainer and the participants throughout all of Germany (and in principle throughout the world) follows. Mercedes-Benz is convinced that this continuing vocational training system is an economic, short-term strategy to provide continuing vocational training for a large number of employees. The efficiency of the system, which is to be introduced at the end of the year, lies in the large number of participating repair shop staff and the possibility of taking part in continuing vocational training lessons without losing time through travel. Mercedes-Benz also .regards this project as good publicity.

These strategies aim to make continuing vocational training as efficient as possible and are oriented to that extent on using AV-media or computed-based learning.

Apart from the above-mentioned media, there are three other lines of development which should be noted briefly:

1. Self-teaching materials and computer-based learning (AV-media and CBL)

Assessment:
This method is based on a strict separation of working and learning with emphasis on "theoretical knowledge".

2. Activity-oriented learning

Assessment:
This method is based on a comprehensive approach to continuing vocational training and the fact that important knowledge can be transmitted by simulation and sensory experiences.

3. *Reintegration of work and learning through tutorial, computer-based learning (interactive media)*

Assessment:
This takes advantage of the learning potential of the work process.

A detailed discussion of these lines of development is not possible at this juncture. Diagram 6.2 shows trends in the importance of approaches over the past years. It is assumed and desirable that, in future, learning by the AV-media and CBL will be replaced by interactive learning as this integrates both learning and working. This could also contribute towards overcoming the capacity problems in continuing vocational training mentioned earlier.

6.10 Trainers

In all groups of providers, the trainers play an important part. They are important for the transfer of know-how in two directions:

a. from the provider to the employee
b. from the employee to the provider.

The latter is considered extremely important for manufacturer-oriented providers as this offers them a good opportunity to learn from employees in the repair shop something about the product, the organization, the relationship between partners, i.e. the manufacturers, the dealers, and the customers. None of the studies report, however, that know-how transfer from employees in a repair shop to the manufacturer is systematically organized during continuing vocational training. This is usually part of continuing vocational training, in some instances the trainers adopt particular methods to identify the weaknesses in a repair shop.

Feedback from the employees who participated in courses given by the groups of providers in groups 2, 3 and 4 is used primarily to modify courses, to update them and to reorganize them in order to adapt them to the needs of the employees.

The formal skills of trainers of all providers are very similar. Usually the trainers are engineers, very experienced technicians or highly qualified master craftsmen. The public providers of training in several countries (e.g. D) require a state examination for trainers who are in the civil service. In order to take this examination, the trainers/instructors must study both technical and educational subjects at university.

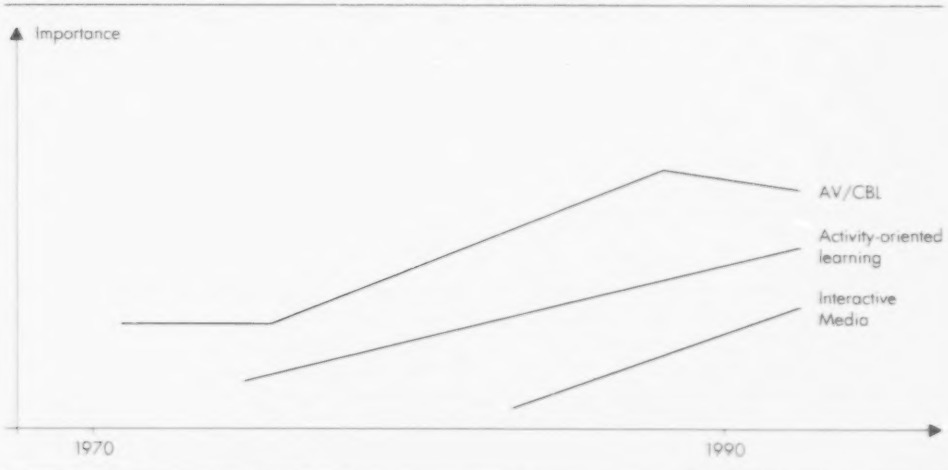
A background knowledge of motor vehicle technology, educational skills and very good knowledge of a foreign language are in high demand of trainers in manufacturer-oriented and private providers of training.

To guarantee that skilled continuing vocational training is delivered in the repair shops to attain quality service, the trainers working for manufacturer-oriented providers often receive further training in the customer service schools of the manufacturer on the following occasions:

- product innovation
- introduction of new service strategies and repair methods
- introduction of new customer service strategies
- introduction of new sales strategies (only for sales personnel).

Continuing training centres involved in these tasks are usually located near to the manufacturing firms or the importer centres. Several European importers have their centres in Belgium. Trainers from throughout Europe must travel to Belgium to take part in continuing vocational training. The proce-

Diagram 6.2 – Importance of different approaches to continuing vocational training



dure is similar for manufacturer centres. The amount of continuing vocational training per trainee varies between one week to 25 days per year.

The trainers working for private providers have no access to this type of continuing vocational training. They have no regular opportunity to update their knowledge and skills. To compensate for this, they attempt to take part in courses provided by component producers.

The continuing vocational training of trainers working for associations/trade unions and public bodies is also limited. The studies from the EU Member States did not report on frequent continuing vocational training for trainers. There is only one type of cascade system for these trainers which is organized in cooperation with the manufacturer and importer training centres or the continuing vocational training is organized in line with the particular needs of various providers, for example: selected trainer groups can take part in courses offered by manufacturer-oriented providers.

It cannot be deduced from this that the trainers in manufacturer-oriented providers have better opportunities to update their skills. Trainers working for other providers do face limitations. It is difficult for them to maintain the required skills.

6.11 Costs of continuing vocational training

The costs of continuing vocational training are hard to ascertain for two reasons:

a. The costs incurred at repair shop level or in small companies are not usually calculated because the owner regards continuing vocational training as absolutely necessary. This was true for most of the case studies (e.g. NL).

   Only Portugal reported a negative attitude to continuing vocational training in the country. "Training is a waste of time" (P), in the words of an employee.

b. There are no figures on the providers of training as these costs are part of the total calculation of companies. The providers in groups B and C do not make specific cost calculations.

Discussion of the costs of continuing vocational training should be analyzed with regard to the four provider groups.

Manufacturer-oriented providers

Courses organized by manufacturer-oriented providers are usually free of charge to the authorized dealers, whereby participation in a number of lengthier continuing vocational training programmes as, for example, sales training programmes, are not free of charge. The tuition fees are, however, usually low and are based on the fact that external trainers must be employed for this sort of training. In general it can be said that the costs and the funding of continuing vocational training is treated very differently. The following provides details:

a. In smaller sized repair shops the costs for continuing vocational training are not calculated. One pertinent justification was given by the owner of a small repair shop (size I):

   "In a family business like ours we treat things differently than in a large company where everything must be prepared, planned and noted in the budget. We have no special budget for continuing vocational training. We do not count man/hours here and we do not keep a record of costs as such." (NL)

b. In larger firms (sizes IV and V), and sometimes in smaller firms, the costs of training are often calculated. It is common practice that

   - the costs of training at a manufacturer-oriented centre are borne by the manufacturer;
   - the travel and subsistence costs are borne by the dealer;
   - the dealer must cope with the costs resulting from loss of working time and must continue to pay wages and salaries.

c. A number of case studies (P, NL, D, IRL, E) report that one day of continuing vocational training in a manufacturer-oriented training centre costs 500 ECU at repair shop level. This does not include the costs for the training provider. Some other firms stated that the total continuing vocational training costs for employees were on average 0.7–2.73% of total wage costs annually (E, L).

Training provision from employer associations/ trade unions

These provide continuing vocational training courses during working time and evening courses. If courses are taken during working time the costs can also be calculated as 500 ECU for the repair shop. Normally travel costs are lower because continuing vocational training centres are often to be found in the region. The courses are not free of charge.

In attending evening courses, there is no loss of production for the company and no extra salary at repair shop level for taking the course. This lowers the overall cost.

The employees in independent repair shops usually take those courses offered by the training provider.

Public providers of training

With regard to costs, the public providers are in a position comparable to that of the employer association and trade union providers. The costs at repair shop level are approximately the same.

Private providers

The costs for courses given by private providers are similar to those of manufacturer-oriented providers. The repair shop usually must pay an additional fee of some 1700 ECU per week. On account of this the repair shops only send employees to courses of private providers if these courses are not offered by other providers (e.g. introduction to computer-based administration).

In conclusion, it can be stated that repair shops usually do not fund evening courses taken by their employees. This type of training should be supported if the owner is interested in improving the skills level of his employees without a loss in working time.

Another supportive measure for continuing vocational training has been reported in Denmark and the Netherlands:

When taking part in AMU courses in Denmark, the participant receives full salary. In the Netherlands the dealer pays a daily compensation from the continuing vocational training fund for employees on training (NL).

6.12 Evaluation of costs

The case studies do not indicate any systematic evaluation of the cost benefit effect of continuing vocational training. Hence, no great need seems to be felt for this. On the whole the costs of training are not excessive while the benefit is often self-evident. In particular, mechanics working in dealer companies would not be able to perform their tasks adequately without receiving on-going continuing vocational training in the latest technological trends. One of the problems arising in smaller general repair shops is the fact that mechanics do not have the opportunity to gather experience with the skills acquired in continuing vocational training courses as there is too little work in the field of electronics in the company. This means that all courses do not provide a maximum return (NL, Conclusions).

7. CONCLUSIONS: FROM REPAIR SHOPS TO QUALITY SERVICE STATIONS

7.1 Quality competition and quality service

7.2 High-tech motor vehicles and the change in tasks

7.3 Repair and quality consciousness

7.4 Standardization and modularization versus transferability and mobility

7.5 Adaptive versus forward qualification and qualification planning

7.6 The role of the providers of continuing vocational training

7.7 Training concepts and their adaption to the needs of countries and repair shops

7.8 Need for training and restrictions on account of lack of capacity

7.9 Continuing vocational training and work organization

7.10 Control versus cooperation of manufacturers and dealers

7.11 Towards the quality servicing stations

7.12 Towards universal multi-skilled motor vehicle mechatronics

7.13 The quality servicing station as a place for vocational training and continuing training

7.14 Continuing vocational training costs as an investment in quality service

7.15 New requirements lead to a new job design and different concepts of continuing vocational training

7.16 Smaller repair shops are facing elimination on account of the need to invest

7.17 Environmental requirements must be respected by quality-oriented servicing stations

Bibliography

Appendix I, II and II

Abbreviations

PART 3:
TRENDS

7. CONCLUSIONS: FROM REPAIR SHOPS TO QUALITY SERVICE STATIONS

7.1 Quality competition and quality service

The European motor vehicle industry is confronted with a growing trend towards *quality competition* in a global market. In addition to the high quality expected by the customer (customer market), the decision on which make of motor vehicle to buy is influenced by the quality of after-sales service and the quality of skilled advice at the time of the sale. For the more expensive make of motor vehicle, the sales action also plays an increasing role. The European motor vehicle industry is reacting to this trend with varying degrees of success.

The British Sector Report points to a remarkable example of how the state provides support for structural changes: "In addition to direct continuing vocational training, the BS 5750 standard is the most important factor for change in the sector. A firm working to the BS 5750 standard must formulate aims, show proof of measures on how these aims are to be attained and must prove to inspectors that these aims are being pursued in practice. One element of the BS 5750 standard is that the firms must prove that they carry out continuing vocational training both at company and individual level. For many company and government contracts BS 5750 is a prerequisite for obtaining the contract and this is also the case in the motor vehicle sector".

The European motor vehicle industry is not competitive without high quality service at a high level particularly on third markets.

The sector studies show that the structural change towards quality servicing stations is in full swing, but that European countries still have to cope with structural change the degree of which varies depending on the country. A number of national regulations and traditions are influential in this trend (in the sense of good practice):

- the Dutch Working Conditions Act;
- the experience-oriented training, in cooperation with companies, of motor vehicle employees with a broad skills base;
- continuing vocational training opportunities for skilled workers as technicians or master tradesmen (dual continuing vocational training);
- the introduction of standards (e.g. BS 5750) to improve servicing quality at all levels of the company;
- in a number of EU Member States (e.g. D, DK) the motor vehicle sector has the largest number of apprentices. This results in a substantial input in the European labour market in the form of highly-skilled workers.

Normal practice, on the other hand, is characterized strongly by endeavours of the motor vehicle manufacturers in very different national conditions to compensate for deficits in initial vocational training through manufacturer-related continuing vocational training. Of necessity, the customer service schools currently undertake to a large extent the tasks of initial vocational training.

7.2 High-tech motor vehicles and the change in tasks

The trend towards high-tech motor vehicles with highly integrated and modular technology, towards a multitude of motor vehicles which is scarcely surveyable even by experts in a certain make, towards a reduction in the need for repair and towards further prolongation of service intervals and of guarantee periods for important motor vehicle components will result in a *basic change of tasks* for motor vehicle repair shops:

- the classical mechanical repairs will become less important in favour of a replacement of components (engine replacement, gearbox replacement, replacement of control components, etc.)
- skills in handling diagnostic systems will become increasingly important and necessary;
- the share of repair work in computer and micro-electronic components is minimal. Should repair become necessary, the component is replaced;
- on the other hand, motor vehicle bodywork and accident work is becoming increasingly important;
- the core of repair shop tasks is diagnosis and standard servicing.

Mastering these tasks requires excellent motor vehicle system knowledge, to the extent that this is relevant for servicing and repair, and, in particular, *methodological competence*:

- Using which tools and media, can I make the motor vehicle and its condition transparent?
- How do I diagnose a fault as quickly as possible with the help of self-diagnosis and diagnostic equipment?

The creation of the service technician occupation in close cooperation between the manufacturer, the motor vehicle trade and the social partners in Germany is a good example of innovative regulation. This is particularly true when continuing vocational training is made available to as many skilled workers as possible, up to the service technician and the foreman. Normal skilling

practices at the level of skilled worker, technician and master tradesman are still strongly oriented towards the classical concept of the repair shop and there is a high degree of division of labour.

7.3 Repair and quality consciousness

Carrying out repair work subsequent to fault diagnosis requires a high degree of theoretical knowledge as the skilled worker must make use of well-prepared and programmed repair manuals. This requires knowledge of symbols, diagram structures and technical explanations as well as the ability to implement these instructions in practice. Here it is a question of a high degree of quality consciousness and the ability to make high quality repairs without supervision by a superior. This challenge to the motor vehicle industry is the result of three factors:

- the increasing security requirements and standards;
- the decisive criteria of quality servicing with as low a level of repair as possible;
- the legal provisions in the areas of environmental protection, road safety and consumer protection.

7.4 Standardization and modularization versus transferability and mobility

Two contradictory trends can be identified in the motor vehicle sector:

- On the one hand, existing international and company *norms* facilitate a *standardization* of all motor vehicle technology. This is encouraged by the necessity to satisfy the whole spectrum of customer wishes. This is only possible through a module system – fewer basic models which have differing qualities depending on the components and the programmed control instruments. This ultimately culminates in the *modular motor vehicle*. The result of this trend is that the vast array of motor vehicles is increasing while technology is converging.
- For repair shops the manufacturers and suppliers make available tools and diagnostic equipment for diagnosing and detecting faults. These differ greatly in their applicability to similar tasks and in their work surfaces and thus their operation. The basic functions of these devices, however, are the same.

This trend means that there are significant differences in operating knowledge of tools and diagnostic systems for comparable tasks in the repair shop. This operating know-how can only be transferred to devices of other manufacturers to a very limited extent which results in low transferability and consequently hampers mobility. In the case of migration to another motor vehicle make, this knowledge must be newly acquired through adequate continuing vocational training measures. This leads to avoidable continuing vocational training expenditure and a *blocking of training staff* who could rather be assigned to develop skills related to *work processes* such as *methodical competence* (e.g. how to carry out diagnosis), functional knowledge (e.g. how do engine management systems work?) and *instrumental abilities and skills* (e.g. mastering of computer systems).

The development of work process related skills would be more advantageous. Good practice stresses work process related skills and tries to reduce the scope of operating knowledge through user-friendly design of equipment.

As for normal practice, the trend towards the development and implementation of equipment and systems requiring a high degree of operating knowledge is still continuing.

7.5 Adaptive versus forward qualification and qualification planning

There is no other sector with more developed continuing vocational training systems in the shape of modular course systems featuring highly modern media and methods than the motor vehicle sector. These measures are developed by the motor vehicle manufacturer and are being constantly updated to give the outlets of the dealership and repair shop network sufficient qualifications in order that they can successfully market the make of motor vehicle.

This direct economic interest of the manufacturer in skilling employees in repairs and sales accounts for the existence of the highly developed modular curricula which motor vehicle manufacturers make available to the trade for the continuing vocational training of their employees. Successful sales and servicing in the sector require that in introducing a new model the trade is prepared for sales, repair and servicing. This challenge of prospective planning and implementing corresponding continuing vocational training programmes is being catered for by most manufacturers in cooperation with their authorized dealers and subsidiaries. The authorized repair shops can fall back on carefully planned curricula and courses.

Good practice is characterized by the fact that the design of the actual continuing vocational training offer is a result of the dialogue between the manufacturer and the authorized dealer during which the dealers concert their skill needs with the skilling offer of the manufacturer. Manufacturers setting up decentralized continuing vocational training courses in the repair shops is also innovative.

Good practice in the authorized dealer consists of providing all employees with the opportunity to take part in broad continuing vocational training organized by the providers of this.

The attempts on the part of some manufacturers to support the continuing vocational training of employees in their repair shops through registering on computer all continuing vocational training activities and subsequently to decide on the required skilling measures in individual cases, corresponds to a "top-down" concept. For most planners of continuing vocational training this appears to be a particularly effective control mechanism. The "bottom-up" concept is just as widespread and in this the demand for continuing vocational training in the authorized dealerships is gauged as the scope required. There are various continuing vocational training models drawn up by motor vehicle manufacturers. Both concepts have their disadvantages. A third model, the cooperation model, attempts to blend the advantages of the bottom-up and the top-down concept and to avoid disadvantages. Only through this can good practice be attained.

7.6 The role of the providers of continuing vocational training

The general demand for quality servicing, technical trends, environmental and safety regulations and an improvement in customer service results in a great need for continuing vocational training in the sector. To respond to these needs, four groups of providers of continuing vocational training are active in the sector:

- Manufacturer-oriented providers (Customer Service Schools of the motor vehicle manufacturers or importers; subcontractors of motor vehicle manufacturers)
- Employer and employee organization providers and the trade unions
- Public providers
- Private providers

All providers oriented themselves towards intensifying continuing in-service training of current personnel and a number of initiatives are being taken in the sector to respond to those developments in technical and commercial fields and in the area of quality customer service. The tasks, the concepts and the strategies of the providers are usually influenced by the specific situation prevailing in the sector of the respective country.

The infrastructure for continuing vocational training in the motor vehicle sector in EU Member States is determined by the four groups of providers already mentioned.

The continuing vocational training offer is determined by the motor vehicle manufacturer and its training centres. They cover a wide spectrum of the required continuing vocational training activities. Providers from trade unions, employers' associations and other organizations as well as public and private providers must be regarded as additional providers of a supplementary training offer. This offer can be made use of by all employees and gives, in particular, the *independent* repair shops access to continuing vocational training.

The Danish Sector Report quotes figures which stress the dominant position of manufacturer-oriented providers. In 1988, some 68% of all employees in the sector participated in courses offered by importers' organizations although the other three groups of providers have a good infrastructure. It can be assumed that these figures do not differ significantly and that comparable values can be ascertained in the other EU Member States.

Private providers do not play a significant part. They cover market segments which are not usually covered by other providers of training.

The training offer of manufacturer-oriented providers is determined exclusively for the employees of authorized dealers. Participation in courses offered by other providers is only considered if skill requirements of staff are not satisfied by the programmes offered by the manufacturer-oriented providers.

The employees in independent repair shops do not have access to the courses offered by manufacturer-oriented providers. They may participate in the courses offered by component manufacturers and non-manufacturer-oriented providers.

For authorized dealers and their employees, the extension of the training infrastructure from the point of view of increasing servicing quality and skills in the face of rapid technical development is an example of good practice when all employees have the opportunity to benefit from this, to ensure the required skills level and improve opportunities on the market. Employees of independent dealers cannot participate because they do not have access to the continuing vocational training programmes of authorized dealers.

This group makes up 25–30% of all employees in the sector throughout the EU Member States and the current offer of courses by other providers (trade union organizations, associations in the sector, state bodies, private bodies) is particularly important. These bodies can promote the skills required for the work process and can ensure formal skill standards through certification. They could also enable disadvantaged groups to gain entry to the sector.

From this point of view, the broadly based activities of INNOVAM (NL), ANFA (F), INEMA (E), ZDK (D), SIMI (IRL), Guild Chamber (L) or the franchise group LEX (UK) may be considered examples of good practice because a number of providers supplement each other and access to this training is not determined by allegiance to a particular make of motor vehicle.

7.7 Training concepts and their adaption to the needs of countries and repair shops

The continuing vocational training concepts are influenced by the policies of the provider, the national situation (e.g. skill needs, level of initial training, technological developments, environmental and safety legislation) at national and international levels, current and future needs for skills and a formal or informal system of certification on the part of certain providers.

In general, the situation may be summed up as follows:

- Providers of continuing vocational training from the trade union and employer sides as well as public and private bodies can only be regarded as supplementary to the manufacturer-oriented organizations. Their concepts and certifications focus on the structures of the national market. Where possible these institutions award generally recognized certificates.

- Manufacturer-oriented providers usually have an informal internal certification system which is adapted to the dealer network. Their transversal concept strategies vary. Some offer the same *hierarchical-oriented course* concept throughout Europe with a variety of certificates (normally three levels: elementary, master tradesmen, technician). This course concept is what is termed a module concept which is structured both horizontally and vertically.

- Others offer a course concept which takes into consideration the skills structure in the dealers. This four-phase concept trains mechanics over a period of years. A particular characteristic of this concept is that it is adapted to the standard of initial vocational training in a particular country. The continuing vocational training programmes within this concept can be adapted specifically to the individual needs of employees and companies. This concept is preferred by a number of Japanese manufacturers.

Concepts which can be transferred to other EU Member States taking into consideration the national context are an example of good practice. National concepts which develop homogenous skills to promote the mobility of employees can be regarded as normal practice.

7.8 Need for training and restrictions on account of lack of capacity

Given the many changes in the sector, the need for continuing vocational training over the past decade has risen steadily. This trend is still continuing and strategies have been developed to cope with the continuing vocational training need in the motor vehicle sector. Some of these strategies are:

- prolongation of continuing vocational training in the repair shops

- extension of computer-based diagnostic techniques

- integration of learning aids in work stations

- extension of the continuing vocational training offer of non-manufacturer-oriented providers.

Each of these strategies has its limitations. The shift in continuing vocational training activities to repair shop level results in a reduction in direct contact between employees in the repair shop and the manufacturer. The spread of computer-based tools and materials requires on-line connection to the manufacturer if feedback is to be assured.

The extension of the training offer of non-manufacturer-oriented providers can help to overcome bottlenecks and would be advantageous for independent repair shops. In this context, organization solutions must be found. Examples of this are INNOVAM (NL), ZDK (D) and ANFA (F).

In conclusion it must be stated that continuing vocational training in the context of real corporate conditions could raise the quality of continuing vocational training if the necessary underlying conditions are created. The concept of good practice offers the opportunity for practice-related evaluation of products (motor vehicles, tools, diagnostic equipment). Relations and conditions for a cooperative model between all concerned (manufacturer – provider – repair shop owner – employee) must be developed.

7.9 Continuing vocational training and work organization

Primarily two models compete with each other in the repair shop and have substantial implications for the continuing vocational training offer:

- the division of labour in the repair shop according to specialities carried out by specialists;

- the all-round or versatile concept in which broadly-skilled workers are qualified to undertake a broad range of tasks.

The *first concept* is more common, depending on the size of the company, but with increasing

integrated motor vehicle technology and greater emphasis on knowledge of methods, it stands in contradiction to the trend towards quality service in stations. To a certain extent, the continuing vocational training offer is a reaction to this specialization: specialists visit "their" special courses. A better assessment of companies under internal division of labour and the resulting demand for continuing vocational training (e.g. Mercedes, B) could lead to a better adaption of programmes to the needs of companies. A work organizational innovation can, however, not yet be attained.

The *second concept* presupposes a high level of skills in the repair shop and increases the flexibility of work organization substantially. For smaller companies – and they will form the majority in the future – this is of particular advantage. Through this model, the team concept can be implemented much more easily as has been tested successfully in a number of instances.

Skilling for the team concept is a *challenge to continuing vocational training* in the motor vehicle industry. The team concept as a form of good practice promises substantial economic and skill innovations. Such an organizational concept facilitates implementation of a greater customer orientation in the servicing area as already striven for and implemented by many companies in the sales section. It also permits greater integration of older or less-skilled workers.

Between these two models there are differences in work organization. These differences depend on the size of the repair shop, the skills available on the labour market, the hierarchy of continuing vocational training (e.g. various skill levels, preparation for a particular task, etc.) and on the repair shop policy. Frequently, there is specialization in electronics and diagnostics. A division of tasks in relation to simple work is also common. The separation of motor vehicle bodywork and spraying is standard. Other forms of work distribution are also to be found.

7.10 Control versus cooperation of manufacturers and dealers

Motor vehicle manufacturers are obliged to market their products. Dealers and repair shops also play a decisive role in their ability to compete. This relationship between the manufacturer and service and trade accounts for the great interest of manufacturers in the broadest possible support and supervision of the distributor network. Dealer contracts play an important part in defining the relationship between manufacturer and dealer.

Normal practice is characterized by a control relationship through which the manufacturer attempts to steer and control the behaviour of the individual dealer. The manufacturers, however, forget that this practice does not reveal one of the most important sources of experience, i.e. the customer's verdict and evaluation of the quality of their products.

The organization of the relationship between manufacturers and repair shops towards cooperation for the sake of economic prosperity of both parties always includes the aspect: manufacturers learn from *repair shops and dealers*.

The statistical methods used at present for compiling repair shop tasks (kind of repairs carried out, faults found) are by no means sufficient.

7.11 Towards the quality servicing stations

The current range of motor vehicle repair shops is characterized by a predominance of authorized dealers for one make combined with the entire range of service. These companies are characterized by a high level of manufacturer-oriented continuing vocational training of their employees and by increasingly high quality service. The trend towards exclusive dealers practice (one make only) will continue. Consequently, motor vehicle manufacturers show a tendency towards *lean service* with the following characteristics:

- Development of subcontracting repair shops to carry out specialist tasks which can be carried out less expensively (e.g. motor vehicle bodywork, spraying, repair of certain components);
- Creation of a clear division of tasks in the authorized repair shops which are more strongly oriented towards the interests of the customer:

  the team concept with less internal horizontal and vertical division of labour (broadly-skilled workers),

  development of a quick-service section,

  secondhand motor vehicle sales and service,

  strengthening the customer relations section through carrying out administrative tasks relating to the purchase, registration, insurance, accidents, sales, M.O.T., etc.

The freedom of sales, service and repair has proved effective and remains the dominant company model. A dwindling share of very small repair shops for repairing secondhand vehicles and for specialist repairs which could almost be termed "moonlight" repair shops will remain in existence.

With these general trends the average number of employees per repair shop, as in the United Kingdom, will increase substantially. Only then can investments for equipment in sophisticated workplaces in the repair shops of the future be

made and quality standards of distribution, service and repair as defined by manufacturers and government regulations be met.

It cannot be forecast whether the initial trends towards the development of mega-dealers will stabilize. They will, however, be influenced by possible modification of EU Regulation No. 123/85 in 1995. If the EU attaches greater importance to freedom of competition in this sector, this could lead to a major swing towards mega-dealer centres. Further studies are required, among others in the US where this concept is common.

7.12 Towards universal multi-skilled motor vehicle mechatronics

Skill development does not occur of its own accord, nor can it be derived from the development towards high-tech motor vehicles. A decisive mediation factor is the organizational concept of the company. Team organization and lean service linked with reduced horizontal and vertical division of tasks (flat hierarchy) and a high and broad level of skills in the productive area (service and sales) require broadly-qualified skilled workers in the repair shop who can attain the level of service technician through continuing vocational training.

More than two skill levels are therefore counterproductive. Formalized and specialized motor vehicle occupations with more than two specializations in the dual vocational training scheme to the level of skilled worker do not seem desirable. Occupational titles such as "electro-mechanic", "motor vehicle electric mechanic" or "mechanic electrician" already point towards the fact that a single comprehensive occupational profile is trendsetting for the future. The title of motor vehicle mechatronic seems to be adequate for this.

As for the field of sales, a wide range of prequalifications will be maintained. Special and motor vehicle make-related qualifications must then be imparted within the framework of continuing vocational training.

The sector reports reveal that according to its curricula educationally-organized continuing vocational training imparts semi-academic and specialized knowledge rather than knowledge based on work and experience.

7.13 The quality servicing station as a place for vocational training and continuing training

In a number of European countries, the repair shops are involved in the practical training of skilled workers in the sector. In a number of countries (e.g. DK, NL) the company is the place where commercial and technical training takes place.

There are economic reasons for further development of this tradition of skilled practical vocational training. An occupational qualification not only imparts occupational abilities, but social and personal skills required for quality service: responsibility, interest, ability to work in a team.

The new comprehensive occupation of motor vehicle mechatronic, the name already exists in an informal way in many repair shops, represents an important element for a wider segment of the European labour market.

7.14 Continuing vocational training costs as an investment in quality service

Continuing vocational training costs are composed of:

- costs for developing and implementing modular continuing vocational training systems by the motor vehicle manufacturers – including their continuing vocational training centres;
- costs of the repair shop which are incurred on account of loss of working time and other direct costs (equipment, travel costs);
- costs for non-manufacturer-oriented continuing vocational training institutions covered by public or other budgets (fund financing).

The scope of continuing vocational training measures varies between 1 and 10 days according to the manufacturer and the authorized repair shop with an increasing tendency. The strong pressure for continuing vocational training leads to an increased economic burden on the companies, manufacturers, repair shops and dealers. Should manufacturers and repair shops agree on introducing autodidactic materials for free time studies, this may result in disproportionately high continuing vocational training pressure on employees.

In general, motor vehicle manufacturers and repair shops and their organizations are convinced that continuing vocational training is not just a cost factor, but is primarily an investment in human resources. Two contradictory interests must be reconciled by manufacturers and repair shops:

- the need to improve continuing vocational training;
- increased pressure to rationalize as a result of increased competition and rising costs for continuing vocational training.

A number of solutions can be found for mediation between these two contradictory forces:

In about one-third of the cases reviewed, the concept of continuing vocational training for all employees has been implemented. Many manu-

facturers have stated explicitly that all employees should participate in continuing vocational training with due regard to the division of tasks within the company. To this end, complicated control and monitoring concepts have been developed. Manufacturers rarely invest more than 3.5 training days per year and employee in continuing vocational training. If more training is required, this additional need is transposed to the intermediate level (i.e. importers, agencies). Such a continuing vocational training concept of training for all in conjunction with manufacturer training adds substantially to the costs for the manufacturer and there is an increasing tendency to involve importers and agencies to a greater extent in continuing vocational training.

A further cost reduction together with implementation of high quality continuing vocational training seems to be possible through developing and implementing tutorial computer-based and networked diagnostic and information systems (BMW, Mercedes-Benz). This concept of a "learning by doing process" combined with high quality continuing vocational training (central and decentral) points towards good practice.

7.15 New requirements lead to a new job design and different concepts of continuing vocational training

The many developments in the motor vehicle sector (network components in motor vehicles, diagnostic technology, environmental and safety regulations, module vehicles, customer orientation, etc.) brings about a need for new job design. The job design must be underpinned by adapting continuing vocational training courses. Three models are discussed in the surveys:

- Specialization model

This model is still oriented towards a high degree of specialization and a broad division of tasks and ignores the change in the sector towards integrating a broad spectrum of tasks. It facilitates a traditional form of work and organization.

- Multiplier and cascade model

This model is a response to the change in tasks in the repair shops and aims to ensure competitiveness and greater customer satisfaction.

The model comprises the organization of continuing vocational training in such a way that a trainer – who himself has been trained in a customer service school of the manufacturer – passes on his knowledge to colleagues in in-company continuing vocational training classes. This type of continuing vocational training is supported by correspondence courses and self-learning material (multimedia). Usually, the trainer also works as a troubleshooter in the repair shop.

- Comprehensive model

This model takes the profound change in tasks in repair shops into consideration and prepares every employee for a large number of tasks at the workplace. This increases the flexibility of the employee and prepares him for all-round tasks and for tasks within new forms of work organization, i.e. teamwork or active involvement of all members of staff in a general workplace culture (UK, Sector Report). Particular variations in this model (e.g. EUROSTEP, Nissan) ensure European mobility for every employee.

The main characteristic of this model is transversal training – each employee receives continuing vocational training – in order to cope with the large number of tasks.

The new job designs which are applied mainly through a variety of concepts in manufacturers' customer service schools are dominant in repair shops which are linked to particular makes. The employees in independent repair shops have no access to manufacturer-relevant continuing training measures. They must limit themselves to the training offered by trade unions, employer associations and state bodies.

The new dimension of quality service requires comprehensive service and includes company policy on recruitment and promotion. This stresses capabilities and is based on attempts to increase the performance of the individual. Such a philosophy requires the development of group consensus on aims and measures and requires a link between the welfare of the individual and his employer. This could become an important strategy for successful development of competition in the future.

7.16 Smaller repair shops are facing elimination on account of the need to invest

Rapid technological developments in the motor vehicle sector (see chapter 4) lead to greater investment in equipment, machines and testing and diagnostic equipment. This results in a greater need for employees with a high level of qualification in repair work.

The repair shops for particular makes of motor vehicles which have close links to the manufacturer and those repair shops which have links to the importer in the typical importing countries, are strengthening their position through the support that they receive from the manufacturer/importer and on account of the fact that the manufacturer/importer prepares the employees of these repair shops in continuing vocational training courses for new models and technologies (B, DK, NL, IRL, D, F, L).

The normal all-round repair shops which have no links to the manufacturer or to the importer are usually smaller than those with links and do not have sufficient financial resources to purchase new expensive equipment. All the studies are of the opinion "they do not have the same access to information and instruction on new models as do the repair shops linked to particular makes. These conditions strengthen the monopoly of these repair shops" (DK, Sector Report). For example, software containing data, i.e. a new package for each model, is particularly hard to obtain and small repair shops would have to invest substantially in diagnostic software. At present, they can repair the older motor vehicles which are not covered by warranty and do not have so many electronic components.

The question remains open whether these smaller independent repair shops can take up the challenge posed by technical developments and new equipment, environmental requirements, computerization of office administration and quality-oriented legislation, for example, BS 5750 (UK) and Law 122 (I). A decrease in the number of small repair shops which cannot meet these challenges and the expansion and strengthening of larger repair shops (size III and larger) could become a trend.

7.17 Environmental requirements must be respected by quality-oriented servicing stations

Environmental requirements in the sector play an important role for two reasons:

- the product itself, the motor vehicle, will change in such a way that a larger share of materials will be recycled. This leads to new product development by the manufacturer.

- The repair shops themselves must learn to respect environmental legislation and to organize the disposal and recycling of materials which are harmful to the environment. In addition, environmentally-friendly materials (for example, water soluble paints) should be used.

In all EU Member States there is legislation (cf. Sector Studies) on environmental protection to limit exhaust emissions. A number of countries also have laws making provision for handling materials which are harmful to the environment.

Undoubtedly the importance of environmental issues will increase for all categories of repair shops. Employees must be prepared to respect environmental legislation and to make every effort to adhere to these provisions.

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APPENDIX I

Diagnosis

- **E 4 B** (5) — Diagnosis by Opel Tester/Bosch (TECH 80)
- **E 4 S** (5) — Diagnosis by Opel Tester/SUN (TECH 80)
- **T 5.3** (2) — Diagnosis of electronically controlled automatic transmission
- **L 6** (1) — Paint diagnosis and advice on paint problems
- **Seminar of the years** — various topics

Advanced training

Comfort and safety electronics

- **E 3.4** (2) — Opel ABS
- **E 3.3** (1) — Chassis Electronics
- **E 3.2** (2) — LCD instruments, on-board computer and check control
- **E 3.1** (3) — Door electronics

Fuel injection systems

- **E 8.3** (2) — Motronic M 2.5
- **E 8.2** (4) — Motronic ML 4.1 and M 1.5
- **E 7.3** (3) — Ecotronic
- **E 8.1** (4) — Muted Throttle body injections
- **T 1** (4) — Carburettor
- **E 8** (4) — Electronic Fuel injection

Engines

Fuel

- **T 7** (4) — Fuel engines 2.0 L OHC, 2.0 L DOHC

Diesel

- **T 10.3** (3) — Diesel engines 1.5 L
- **T 10.2** (3) — Diesel engines 1.6, 1.7 L
- **T 10.1** (3) — Diesel engines 2.3 L
- **T 10** (5) — Diesel engines/basics

Maintenance/Service

- **T 3** (5) — Opel inspection

Transmission

manual

- **T 2.4** (2) — Manual Transmission R 25, R 28
- **T 2.2** (2) — Manual Transmission 5 speed FWD
- **T 2** (4) — Manual Transmission/Basics

automatic

- **T 5.2** (2) — Automatic Transmission AW 03-71 L/LE
- **T 12** (4) — Automatic Transmission Basics

Paint

- **L 5** (2) — Paint work/Problem solving
- **L 4** (2) — Mica paint
- **L 3** (3) — Paint matching
- **L 1** (5) — Paint work techniques

Body

- **K 1** (2) — Sun Roofs

LCV

- **LNF 2** — Isuzu Electrics
- **LNF 1** (5) — Isuzu Drivetrain

Basic training

- **E** (5) — Basic electrics/electronics
- **T** (5) — Basic mechanics
- **L** (10) — Basic paint
- **K** (5) — Basic Body
- **LNF** (5) — Isuzu Basic LCV (Campo, Midi, Trooper)

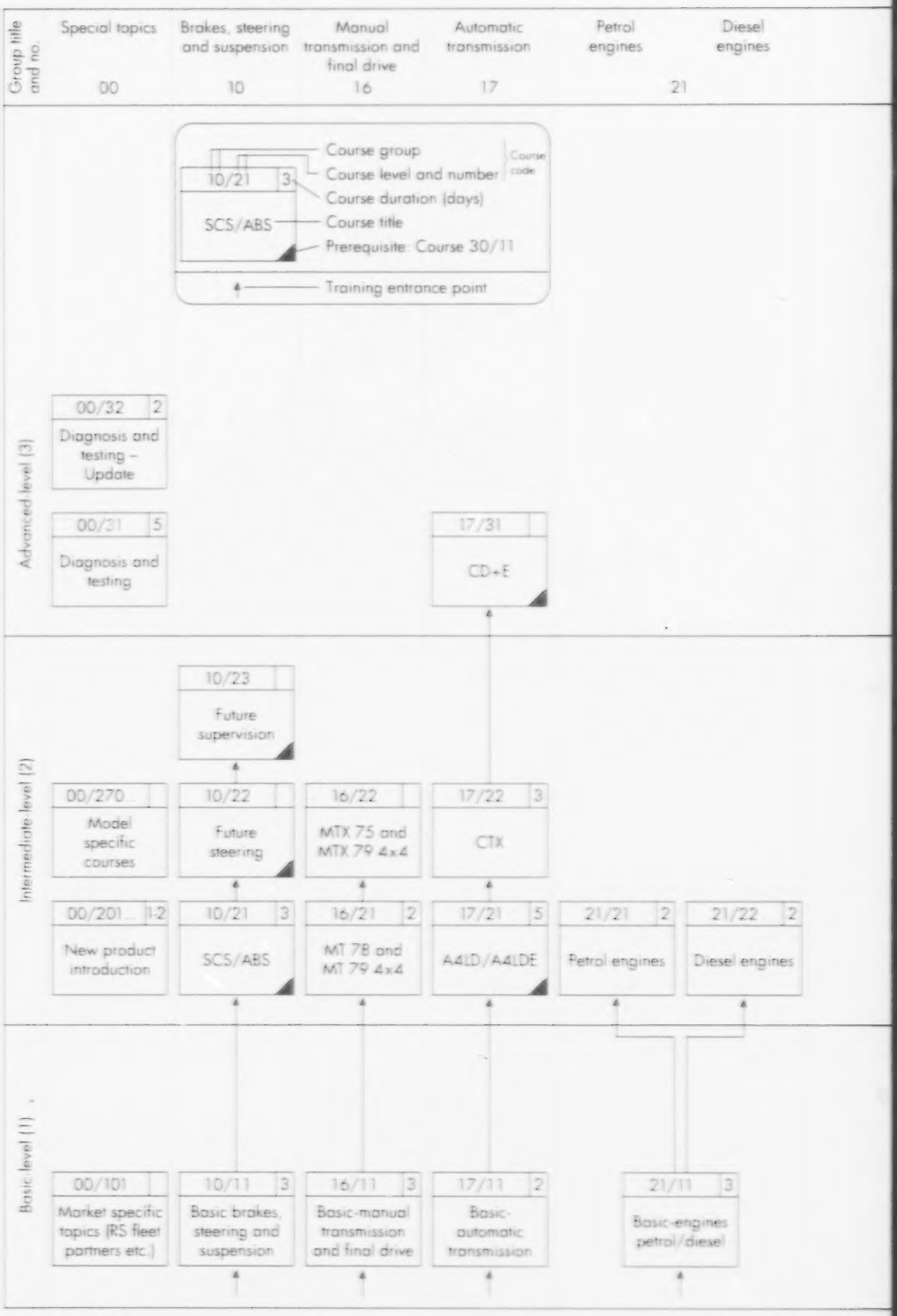
including use of TECH 80/TECH 1

Number in box = duration in days

APPENDIX II

3.

Technical Service Training Curriculum



Source: Ford

Engine management Petrol	Engine management Diesel	Electrical systems	Body and paint	PDI and routine maintenance
29		30	40	54

APPENDIX III

3.

Registration of passenger cars in Western Europe, by country, 1985–1992

	Units '000								% Change
	1985	1986	1987	1988	1989	1990	1991	1992 (Jan–Aug)	1992/91
Germany	2,379	2,829	2,916	2,808	2,832	3,041	4,159	2,769	–11.5
Italy	1,746	1,825	1,977	2,184	2,362	2,348	2,340	1,722	3.7
France	1,766	1,912	2,105	2,217	2,274	2,309	2,031	1,368	0.2
UK	1,832	1,882	2,014	2,216	2,301	2,009	1,592	1,176	– 2.5
Spain[1]	546	650	928	1,011	1,096	936	887	696	13.5
Netherlands	496	561	557	483	496	503	490	354	– 8.7
Belgium	378	395	406	427	440	474	462	388[2]	3.5[2]
Portugal[1]	104	114	129	227	193	213	231	188	23.0
Greece[1]	79	65	51	58	86	115	168	129	14.6
Denmark	157	169	124	89	78	81	84	64	5.3
Irish Republic	60	60	56	62	78	81	68	56	– 0.9
Luxembourg	27	29	30	31	31	34	44	–	–
Total EC (rounded)	9,571	10,492	11,291	11,813	12,267	12,144	12,556	8,909	– 1.8
Switzerland	265	300	303	319	320	323	310	214	– 5.0
Austria	243	262	243	253	276	289	303	239	6.8
Sweden	263	270	316	344	307	230	188	110	– 9.7
Finland	138	143	151	174	177	139	92	50	–26.9
Norway	159	167	115	68	55	62	53	40	11.7
Total EFTA (rounded)	1,069	1,143	1,129	1,158	1,135	1,047	948	653	– 2.5
Total western Europe (rounded)	10,640	11,635	12,420	12,971	13,401	13,187	13,504	9,562	– 2.3

[1] 1985 not EC
[2] including Luxembourg

Source: various national trade associations (1985–1991) and Automotive News (Jan–Aug 1991 and 1992)

ABBREVIATIONS FOR MAIN PROVIDES OF CONTINUING VOCATIONAL TRAINING

DK	AMU	National Labour Market Authority
F	ANECRAM	National Association of Motor Vehicle Distribution and Repair Companies
	ANFA	National Association for Training in the Motor Vehicle Industry
P	ARAN	National Motor Vehicle Association
NL	BOVAG	Employers' organization
P	CECOA	Vocational Training Centre for Trade and Associated Activities
F	CEGOS	Consulting and Training Company
P	CEPRA	Vocational Training Centre for Motor Vehicle Repairs
I	CNA	National Confederation of Craft Trades
	ECIPA	National Professional Training Organization
GR	ELKEPA	Greek Productivity Centre
	EEDE	Greek Company of Business Administration
	EOMMEX	Greek Organization of Manufacturing Companies
IRL	FAS	Training and Employment Authority
E	GAMVAN	Spanish Employers' Association for the Motor Vehicle Sector
GR	GSEE	General Federation of Workers of Greece
	IBEPE	Institute for Industrial Education
P	IEPF	Institute for Employment and Vocational Training
UK	IMI	Institute of the Motor Vehicle Industry
E	INEM	National Institute of Employment
NL	INNOVAM	Innovation and Educational Centre for the Motor Vehicle and Motorcycle Sector
DK	ME	Commission for Continuing Training in the Metal Industries
UK	MITSC	Motor Industry Training Standards Council
	NCVQ	National Council for Vocational Qualification
GR	OAED	Ministry of Labour
	OBEAME	Federation of Motor Vehicle Repair Shops
	OEEK	Organization for Vocational Education and Training
P	PESP	Programme for Economic and Social Progress
GR	POBEAM	Hellenic Federation of Motor Vehicle Repair Shops
UK	ReMIT	Retail Motor Vehicle Industry Training
	RMI	Retail Motor Vehicle Institute
	SCOTVET	Scottish Vocational Educational Council
GR	SEA	Association of Motor Vehicle Traders
	SEAA	Association of Motor Vehicle Importers
	SEB	Association of Greek Industries
IRL	SIMI	Society of the Irish Motor Vehicle Industry
GR	TEE	Technical Chamber of Greece
D	ZDK	Central Association of the German Motor Vehicle Industry

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European report
(FORCE programme)

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Luxembourg: Office for Official Publications of the European Communities

1995 — 89 pp. — 21 x 29.7 cm

ISBN 92-826-8913-1

Price (excluding VAT) in Luxembourg: ECU 8

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04 05 16

HX-85-94-866-EN-C

Price (excluding VAT) in Luxembourg: ECU 8

ISBN 92-826-8913-1

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OF THE EUROPEAN COMMUNITIES
L-2985 Luxembourg

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